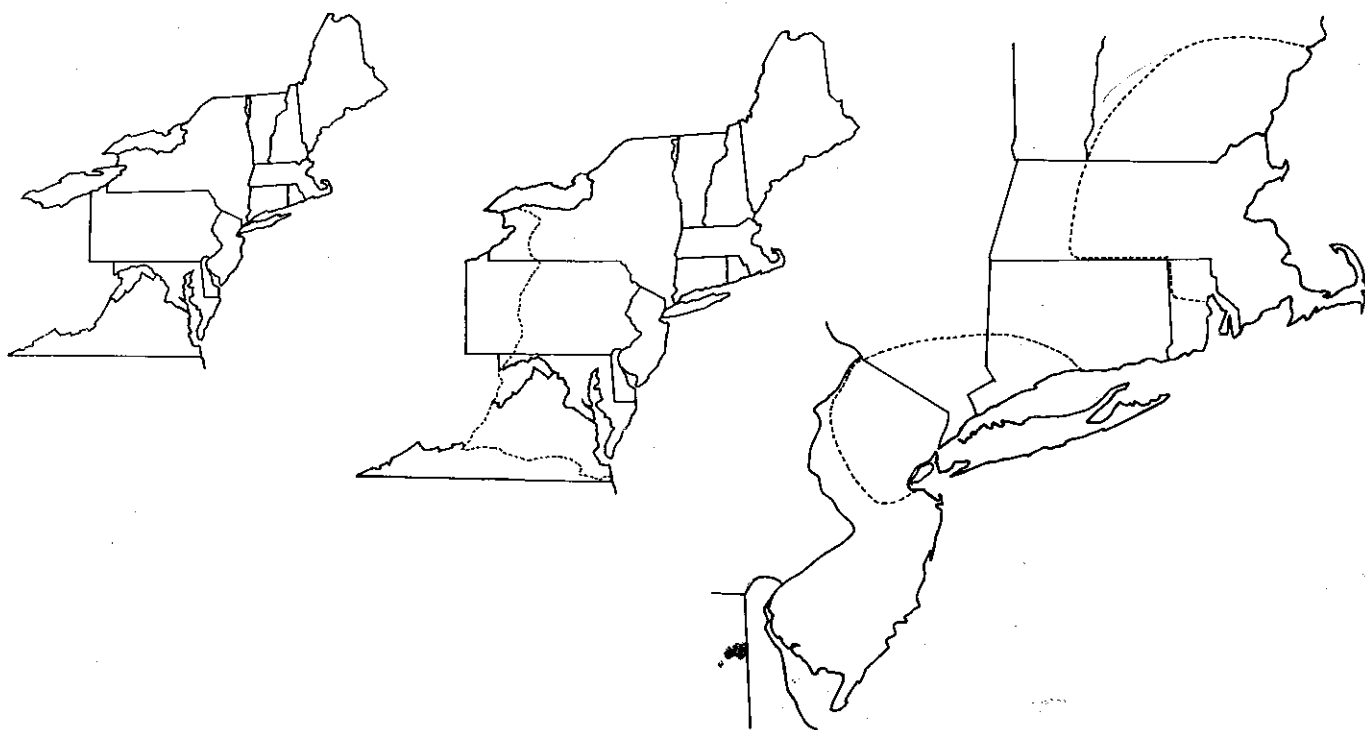


NORTHEASTERN UNITED STATES WATER SUPPLY STUDY

REGIONAL WATER SUPPLY; INSTITUTIONAL ASPECTS

VOLUME I



JULY 1972

DEPARTMENT OF THE ARMY
NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS
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IMPORTANT NOTICE

This report entitled "ORGANIZATIONAL, LEGAL, AND PUBLIC FINANCE ASPECTS OF WATER SUPPLY FOR SOUTHEASTERN NEW ENGLAND AND THE METROPOLITAN AREA OF NEW YORK CITY - NORTHERN NEW JERSEY - WESTERN CONNECTICUT" was prepared by the Institute of Public Administration, New York, New York, under contract with this office. It was prepared as a part of the overall Northeastern United States Water Supply (NEWS) Study, authorized for accomplishment by Public Law 89-298, and assigned to the North Atlantic Division Engineer for accomplishment.

Attention is invited to the preliminary nature of the study for which the report has been prepared. Two preceding studies developed the physical possibilities of water supply regionalization for each area and presented feasible engineering alternatives by which it might be accomplished. The attached report is concerned with an analysis of the organizational, legal, and economic problems, and alternative solutions to those problems. The results of the two engineering feasibility studies supplemented by the results of this institutional feasibility study, constitute the tools with which the Corps of Engineers and other agencies and organizations concerned may reach a decision on which of the various alternatives more detailed study effort should be concentrated.

The reader is cautioned that the Corps of Engineers does not advocate at this time, either in whole or in part, any of the alternatives set forth.

ORGANIZATIONAL, LEGAL AND PUBLIC FINANCE ASPECTS
OF REGIONAL WATER SUPPLY

V o l u m e I.

REPORT

By the
Institute of Public Administration
under contract with the
Department of the Army
North Atlantic Division, Corps of Engineers
as a part of the
Northeastern United States Water Supply Study
Contract No. DACW 52-69-C-0002

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Other Volumes of the Study:

Volume II: Organizational and Legal Alternatives

Volume III: State Surveys

Background materials and economic analyses prepared by the
Institute of Public Administration are also available.

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Chapter 1

INTRODUCTION

This report summarizes a study which explored organizational, legal and economic aspects of water supply in the Northeastern United States Water Supply Study (NEWS) areas for the purpose of identifying alternative frameworks for improved regional planning, decision-making and management. The contract under which the work was performed calls for "feasible alternatives for the legal, economic and organizational framework necessary to create, maintain, and operate regional water supply system[s] to serve the metropolitan area of New York City - Northern New Jersey - Western Connecticut, and . . . the Southeastern New England area."¹

Regionalization for this purpose must be interpreted broadly to include any processes by which the scale and scope of planning or management for water supply are made more comprehensive. The focus, then, is not narrowed to possibilities for creating vast single, integrated structures for both planning and management of all supply for either of the two segments of the NEWS area in their entirety. As is explained below, this particular type of regionalization (complete regionwide functional integration) has low feasibility under present circumstances. Moreover, the engineering studies conducted for NEWS have not identified the main engineering alternatives to be all region projects that would require

1. U. S. Department of the Army, Northeastern United States Water Supply Study, Contract No. DACW 52-69-C-0002.

completely integrated structures. Rather, we are seeking frameworks within which multiple regional projects-- some within single states, some interstate-- of varying scale, technology, and implications for competing uses, can be handled effectively.

This study was asked to concentrate upon frameworks for water supply, with multipurpose aspects considered as important supplements. The interdependencies between water supply, recreation, pollution abatement, conservation, and ecological balance are particularly intensive in these dense, urbanized regions. As a result, a crucial criterion for judging frameworks for supply development is the degree to which they may encourage satisfactory combinations of uses of water and related land resources.² Hence, the water supply alternatives must be viewed as segments of existing and alternative systems of water resource management and all their major components. This prevents narrowing the focus to single purpose regional supply structures.

Except that it usually transcends municipal levels, the concept of regionalism per se does not refer to any specific jurisdictional or geographic scale. Depending on the type of functions to be handled, suitable regional frameworks can variously be provided for the space of a county, a metropolitan area, a state or major part thereof, an interstate basin or

2. Balanced multiple use consideration for planning and project selection is official federal policy established by the United States Senate, Document 97, Policies, Standards and Procedures in the Formulation, Evaluation and Review of Plans for Use and Development of Water and Related Land Resources (1962).

multibasin zone, or the nation as a whole. Different geographic scale may be implied by different stages of water supply operations-- source development, treatment, transmission, retailing, etc. Regional organization is seldom exclusive; a large regional organization, for example, may encompass several smaller regional organizations created for parallel or different purposes.

Regional alternatives can be identified by their political dimension as well as by their geographic dimension. Thus, for example, water supply in substate geographic regions could be provided by: (1) state controlled regional authorities or agencies; (2) boards or commissions composed of representatives of several municipal authorities; (3) independent regional special districts or governments with their own taxing powers; (4) federal agency field districts, etc.; and (5) private sector corporations.

Similarly, interstate geographic regions such as river basins, can have institutions dependent upon federal authority (federal corporations or divisions of a federal line agency); state authority (interstate compacts, interstate contracts, or mixed ownership corporations); or upon a combination of both (federal-state commissions, compact or mixed ownership corporations). Interstate structures can even incorporate municipal representation-- as, for example, a regional arrangement for the Hudson River might include New York City representation due to the importance of the city's transmission facilities.

Reorganization Studies: State of the Art

What kinds of professional tools and methodologies are used to analyze such alternatives for governmental organization?

Public administration is a synthesizing discipline which utilizes methods of political, legal, economic, and management analysis to seek means for helping to achieve defined public policy goals. It is, by definition, normative and pragmatic. But it no longer relies on its own internal principles of "best ways" to do things.

It is useful to summarize briefly some of the concepts that public administration can apply to this and similar studies.

Organizational development (or reorganization) is a process of change in patterned relationships relative to prior or existing patterns. Any organizational alternative posed, then, is to be judged by the desirability and feasibility of the direction and increment of change from the status quo that it is likely to bring about.

Centralized hierarchy is one among many possible patterns of organization. It does not encompass inherent advantages which have general application to all situations. We do not assume that hierarchy is consonant with good management. Integrated hierarchy has demonstrated points of diminishing returns-- for speed of decision-making, for flexibility and innovation, for information gathering and assessment (particularly "soft" information relevant to the social and political context of policy alternatives).

At the other end of a theoretical spectrum from integrated hierarchy may be posited a market model, often described in terms of "political economy." As applied to the water supply, this model supposes multiple public and/or private agencies with autonomous decision-making capability offering service packages from which consuming units (e.g., municipalities) may select. Actually, something close to this pattern is found in water supply for some parts of the northeastern United States. It too has both advantages and disadvantages. It manifests particular limitations for dealing with various kinds of externalities, including nonconsumer interests in common resources, and is not well suited to large scale development projects with large initial capital and technical requirements.

Hence, organizational analysis poses a series of delicate questions about the whole range of possible patterns-- from integrated hierarchy to market model-- as applied to explicitly defined functional problems (in this case water supply) according to also explicitly defined aims or criteria.

The effects (desired or undesired) of various organizational options are probabilistic. The organizational structure selected will influence but not determine the outcome of the policy system. Personnel behavior, political vectors, economic and fiscal trends, and circumstantial events are all factors that may cause a given organizational framework to perform in unpredictable fashion. Tendencies of various organizational options-- not their certain assets and liabilities-- can be identified.

Furthermore, even the criteria for judging governmental options are probabilistic. Preferences of a collective are never certain in advance and are seldom transitively ranked (indeed modern behavioral studies indicate this is also the case with individual preferences). For water management and similarly complex public functions, the relevant criteria are neither mutually exclusive nor entirely consistent. Hence identification and selection of alternatives is not an optimization task, but a process of strategic trade-offs, taking into account that each arrangement may satisfy several criteria and shortchange some others in ways that cannot be objectively measured.

Why Regionalize?

Taking "regionalization" in a broad sense,³ what are the frequently cited reasons for pursuing it?

One paramount reason is to increase the involvement of higher levels of government in the function at hand. The intent of the NEWS act, as clarified by accompanying committee report, is to assure federal action sufficient to prevent serious shortage of water supply in the Northeast. When lower level governments cannot provide adequate supply, regionalization for this purpose may be called for. Development of regional relationships that inject new federal or state impetus into policy systems may (if so designed) stimulate existing agencies to update their methods,

3. To reiterate the definition given on page 1, "regionalization" encompasses any processes by which the scale and scope of planning or management are made more comprehensive.

look farther ahead, broaden their perspectives, and instigate administrative improvements.

2) Regionalization may be required by the specific characteristics of selected projects. The NEWS act poses the possibility of regional projects, for example, that might move water across jurisdictional boundaries and serve interstate consumption markets. When and if such projects are carried out, some type of "regional" mechanism would be selected to do so. Similarly, on a smaller regional scale, interjurisdictional cooperation may be required among separate governments whose water needs have outgrown possible local projects. Depending upon the engineering alternatives selected, projects may require intercommunity watershed management, inter-governmental supply agreements, or metropolitanwide wholesale systems, for example.

Regionalization may also be sought in order to benefit from advantages in scale. (The advantages of scale are not omnipresent but must be empirically assessed in terms of the function being considered.) Economies of scale may be obtainable by regionalization of some types of water supply functions. In several parts of the Northeast, it would be more economical to undertake concerted river development (e.g., of the Hudson or the Merrimack) than for individual municipalities up and down the riverbanks to tap and treat the source individually. Savings particularly adhere to treatment costs. Savings can also be obtained by regionalization that avoids redundant transmission, that facilitates water transfers and interchanges, and that reduces waste in water-surplus localities.

Enlarging the scale of water resource management may facilitate flexible resource use by increasing options open to the operating agency. Enlarged administrative units can raise the level of skill and technology applied (by permitting greater use of specialized human resources and equipment). This applies not only to the ability actually to carry out complex projects, but also to carry out and evaluate engineering studies, to conduct continuing planning analyses, and to apply economic expertise to decision strategy. The variety of skills necessary for solid decision-making in this field cannot be sustained by small, understaffed agencies solely dependent on occasional consultants.

Enlarged scale also has some distinct advantages for identifying and testing new methods of water supply and management by providing a broad base for risk absorption and for coping with uncertainty. Recycling, for example, involves experimentation unlikely to be pursued alone by small jurisdictions.

Regionalization is needed in some instances to internalize spill-over effects related to water supply. Pollution by upstream sources contaminates downstream supplies; development of a source by one agency may preclude its use by others; and, withdrawal of water affects the flow downstream. Internalizing some of these conflicts within a comprehensive decision-making arena can facilitate and improve their resolution.

The capacity to finance water supply development may be enhanced by some regional approaches. Floating bond issues is more difficult and

costly for small municipalities than for the larger jurisdictions, for example.

① Perhaps most important at the current time, in this part of the nation, regional approaches may be sought in order to facilitate coordinated multiple purpose resource allocation, and at the same time to obtain more timely resolution of decision problems. The regional point of view is particularly useful for incorporating environmental factors. Local water supply planners have tended to ignore environmental opportunity costs, first as being outside the purview of water supply planning, and second, because the geographic area in which water is used is frequently distant from the area that feels environmental or other external local effects. A regional process may be sought by which a comprehensive set of factors relating to supply alternatives and their likely effects on other water-related uses and benefits will be regularly and objectively analyzed and injected into public decisions.

② At the same time, the speed and equity with which decision processes resolve conflict and authorize project development could be improved by regional efforts (ranging from federal or state executive leadership to joint planning or conferences). Regionalization for this purpose would seek to induce new patterns of behavior on the part of existing institutions. Such changes in behavior may be pursued in a number of ways. For example, new developers may offer supplementary regional supplies and demonstrate particular river management or water pricing techniques. Or changes may be induced by putting one or more participants in a strong position to lead

negotiations. Or new activities may be created, such as continuing planning procedures with established agenda and deadlines for joint decisions and endorsements by relevant governments. The purpose of regionalization from this standpoint is to cope efficiently with conflict (implying savings in time and equity as well as opportunity costs).

Chapter 2

EXISTING INSTITUTIONS AND THE ORGANIZATIONAL-LEGAL OPTIONS

Because water supply in the northeastern part of the United States historically has been a local function (with many municipal and private utilities relying on their own sources), regionalism implies changes in vested administrative and political patterns aimed at enlarging the scale on which components of this function are handled.

The draft engineering studies for both southeastern New England and the New York metropolitan area implicitly suggest four types of regions which might be applicable to water supply development in the northeastern United States, none of which necessarily excludes the others.

The first type of region is based on the broadest service area of concern. Each of the engineering studies states its initial objective as providing water supply to specifically defined high population regions (i.e., southeastern New England and the New York metropolitan area). Each of the high population target areas is divided into a series of service areas served by numerous suppliers, and the water supply needs and engineering alternatives did not require that they be considered as single service areas for most purposes.

A second type of region is the river basin. Four rivers which figure as important components in all of the illustrative engineering programs are the Merrimack, Connecticut, Hudson, and Delaware. Development of each has interstate aspects. In all cases, there is need for integrated

planning of the entire river basin. Some river developments may require the active participation of more than one state, as in the case of possible Merrimack projects which might necessitate upstream reservoirs or pollution abatement in New Hampshire to provide water supply for parts of Massachusetts. Others may require the agreement of riparians as in the case of New York development of the Connecticut River, where the state of Connecticut is a riparian. Still others might require projects designed and operated to supply more than one state (e.g., the Delaware and some Hudson alternatives).

A third type is the substate region consisting of groups of communities and possibly their potential source areas, all of which fall wholly within one state. Substate regions are defined as groups of communities to be served by one or more common source of supply. In some cases, such as the Ipswich River Watershed in Massachusetts, a possible service area also encompasses its own sources. In others, such as expanded service areas centered on Boston, Providence or New York metropolises, major sources lie outside the service region. In still others, such as northeastern New Jersey, the problems created by a complex of often unconnected supply systems can be resolved jointly only by improved integration in management including joint transmission arrangements.

The states themselves constitute a fourth, highly important type of region. First, state governments are sovereign bodies in the federal system, with key powers over water supply planning, source allocation, funding and quality control. Second, the engineering studies, for the

purpose of analyzing need and existing system capabilities, divided the high population target areas into parts according to the states in which they fall. This procedure was dictated in part by statistical convenience, but also by the relative paucity of water supply interconnections between states. In addition, a majority of the engineering alternatives listed involve development of in-state sources for use by service areas within the same state. Finally, the geographical reach of existing state institutions is a convenient basic structure for resolving the technical, administrative and political issues.

In some cases, a given geographical area falls within more than one kind of region. For example, northern New Jersey is a substate region for purposes of solving common problems of distributing new water supplies. As a component of the state of New Jersey, it may turn to in-state sources outside of its own substate region, or may require the state's services as negotiator to resolve problems of interstate development. Finally, northern New Jersey falls within the Hudson River Basin, which might provide an important source for its future supply.

While water supply problems in the study area are similar insofar as they involve ever larger projects which increasingly are challenged by competing water users, each of the five states is unique with respect to administrative organization and political response having to do with water supply; each presents its own peculiar set of problems in meeting future water needs. For example, eastern Massachusetts might be neatly divided into substate regions, some of which contain their own potential water

supply sources, while northern New Jersey, which is characterized by a maze of competing suppliers, should be viewed as one service area which will need to draw upon common sources of supply. The following discussion identifies some of the elements common to the various states.

Several findings of this study relating to the existing legal-organizational framework are crucial to identifying alternatives for the future. First, there is already a multitude of regional organizations in the NEWS areas concerned with water supply and related resource management. Second, the states themselves appear to be among the most important and feasible regional units for further development of water supply management capability. Third, there are limited but pressing needs for greater and more coherent federal involvement.

If one could begin with a clean slate, it would be theoretically possible to design one regional water resource organization or complementary set of organizations for the NEWS area that would meet existing and foreseeable problems. But we simply do not have a tabula rasa for a drafting board. On the contrary, there is already an oversupply of organizations dealing with water supply and water resources, which cannot be simply washed away, and some of the deficiencies in water management are traceable to proliferation of federal, interstate, and substate regional agencies, without commensurate gains in decision-making or management capability.

Agencies in which the federal government participates seem as susceptible to these difficulties as others. The federal government is

involved in the major basin commissions. Some of its line agencies are engaged in regional supply-related projects, frequently with little intercommunication and coordination (included are the Corps of Engineers, Geological Survey, Environmental Protection Agency, Soil Conservation Service, Office of Saline Water Research, National Park Service and others). Moreover, federal policy-making does not reflect a uniformly broad representative perspective; the fragmented structure of congressional committees, administrative agencies, and advisory and interest groups impinging on water resource decisions at the federal level has produced many narrowly based decisions and several noncomplementary programs.

In some major basins, such as the Delaware and the Great Lakes, various aspects of water management have already been pre-empted by compact agencies which would be difficult to abolish or even to alter. The New England River Basins Commission (NERBC) represents a coordinating framework which is young and should be tested over time. Other federally supported entities include intrastate regional planning agencies, the Tri-State Transportation Commission and an interstate council of governments, which have all engaged in water supply studies.

Existing Regional Suppliers

Supply development in the water-abundant Northeast historically has been undertaken by local public and private utilities. The pattern of local responsibility for the most part has continued into the present. In each of the five states, numerous small utilities still tap nearby sources to supply limited service areas. The systems of New York City, the

Providence Water Supply Board, and the Metropolitan District Commission serving the Boston area, however, grew into large and effective supply operations tapping surface waters outside of the urban service areas. But the pressures of growing demand and urban concentration have not yet been sufficient to trigger consolidation of local operations elsewhere into effective regional systems, as demonstrated by parts of Long Island and northern New Jersey.

Big City Suppliers

One of the basic structural categories for metropolitan regionalization is extraterritoriality of city services. This has been a common approach to water supply functions. The Providence and New York agencies are city instrumentalities that are candidates for carrying out some regional projects. They have an established record of servicing local jurisdictions in their hinterland and of tapping sources outside their service areas. Boston's Metropolitan District Commission is a variant structure in that it is an instrumentality of state government, but with metropolitan jurisdiction. It has an expandable regional service area and a successful history of tapping the state's major source that lies outside its service area. The city of Newark has shown signs of interest in developing its role as regional distributor as well.

Several of the projects listed in NEWS draft engineering reports are also included in or similar to projects in the current plans of these agencies. Their extraterritorial customers, although inclined to dispute some aspects of management and pricing, do not express basic dissatisfaction

with the existing arrangements. The ability of these agencies to float bonds on the financial market for regional projects is high. Obstacles to obtaining funds are not financial in origin for the most part, but have arisen from opposition to proposed projects by groups from source areas and conservation or recreation-oriented interests.

These big city suppliers have strong vested interests in capital facilities and transmission systems that will be components of future regional systems, no matter who develops new sources. They would also remain important customers for any other government instrumentality that would develop and wholesale water from new sources. Finally, as is not always the case, the owning governments do not wish to divest themselves of these functions, which have not been a felt financial burden (and in some respects have turned a profit for city government).¹ In general, then, the big city suppliers are possible candidates for carrying out future regional projects in the Northeast and will inevitably be major participants in any other arrangements arrived at.

At the same time, the big city suppliers confront growing demands from "suburban" consumption areas. As their source needs impinge increasingly upon land and competing potential uses of groups based outside their jurisdictions, it has become more difficult for them to act on their own. Case histories of these agencies' current proposals for

1. An example is that of Newark where application of water revenues to general expenditures staved off a budget crisis in 1971. Water revenues are considered a general fiscal asset by New York City as well.

new source development have several aspects in common. One is the dependence upon resolution of source area-service area and multiple use controversies in their respective state political arenas. Resolution of recent conflicts has not been achieved without lengthy delay. One attribute of the current decision-making process that applies to the big city suppliers is the conservative tendency produced by the multiple sources of delay which hem in the agencies.

Another common phenomenon is increasing interest of the customer areas in obtaining representation in the institutional structure of the supplier, whether by winning approval powers for user associations or by creating a parent institution that is an intermunicipal district or other type of regional authority. Under present arrangements, the customers have very little market choice alternative to entering into agreements with the big city suppliers. Their major channel of representation is through appropriate state water resource agencies and legislatures. While this has given them significant representation in major matters (e.g., new source development, rates), it does not provide ready access to many management decisions (e.g., quality of water supplied to different consuming areas; recreational or local flood control uses of reservoirs, etc.). The big city agencies are charged first and foremost with supplying potable water to the central city. It is their duty to give this highest priority (and indeed there are precious few such services in which the central cities maintain relative advantage). Both the Boston and New York agencies are engaged in disputes over rates charged to suburban subscribers

(a dispute to be resolved in the Massachusetts legislature and New York water resources agency-- with possible appeal to the courts).

Third, the complex web of vested interests in which these systems are enmeshed is rooted in statutes passed by the state legislatures. In Massachusetts, procedures for expansion of the metropolitan service area are provided in the basic statute. In other areas, expansion beyond a certain point (e.g., of the New York system to serve Nassau County) requires fresh statutory provision. Complex and delicate bargaining among numerous participants will be required to transform the big city suppliers into instrumentalities with regional representation or to overcome some of the management rigidities applied by statute or by agency interpretation of it (e.g., the city's interpretation that amounts supplied by New York's system to suburban areas be based upon each municipal population rather than apportioned countywide, which would allow adjustment for industrial and other special uses).

Investor Owned Companies

Nongovernmental companies have long been regional distributors to multimunicipality service areas in the Northeast (especially in New Jersey, Connecticut and Long Island portions of the NEWS areas). In some cases they develop and manage their own sources. In northern New Jersey, they will also distribute supplies from state and possible federal source developments.

As public utilities, these companies are regulated by public service commissions which have generally ruled on rate questions with

sufficient favor to allow the companies satisfactory profits. In some cases they are nevertheless able to offer municipal customers lower rates than competing public distributors.

These companies have vested rights in essential diversion, transmission and distribution facilities, and in many cases present themselves as leading candidates to at least serve as middlemen and transmitters of new regional supplies. In Connecticut, a private company plans to carry out a regional source development listed in the NEWS engineering study.

With the exception of some companies in Suffolk County, most private companies have not been interested in selling out to larger systems and are competitive with development of governmental regional authorities. In some areas the competition is among companies seeking customers and source allocations. This is the case, for example, of two water companies that serve, between them, seven counties of northern New Jersey and one of New York. One of them has competitively gained an advantage over both a big city supply agency (Newark) and a regional water district in attracting municipal subscribers for transmission and distribution of state supplies.

The private companies exert considerable influence as well through voluntary groups (such as the Long Island Water Conference).

Intermunicipal Water Districts and Authorities

The special district or authority is another pattern of regional supply organization existing in the NEWS area. There are many of these serving small groups of municipalities. Most have limited potential and

interest for taking on the type of regional developments listed in the NEWS engineering studies. They do, however, represent an alternative for consolidating distribution and for transfer management in conjunction with regional supply increments.

There are myriad combinations of arrangement in this category. County water authorities are common in New York, for example. An illustration is the Suffolk authority which has successfully competed with very small inefficient private companies, buying out many, to the point of servicing nearly three-quarters of a million people. On the other hand, for over half a century the North Jersey District Water Supply Commission (NJDWSC) has offered an opportunity to municipalities to enter into a comprehensive regional public system, but with little success. The existing private companies have provided a cost advantage to municipal customers and the NJDWSC has seen subscriber interest in supplies to be wholesaled by it dwindle. This process of competition has delayed decision on definitive arrangements for state developed Raritan River supplies for over a decade.

Emerging State Roles

Most state governments were in the past content to leave water supply to local units of government or private companies which, by and large, proved capable of meeting local needs satisfactorily in normal times. As creatures of the states, local governments were affected in their ability to handle the water function by state law governing their general responsibilities, authority and financing ability (e.g., debt

limits, referenda requirements). More direct state action included administrative or legislative decisions respecting water allocation rights and regulation by state health departments to insure the safety of public supplies. The importance of health departments in the regulation of water supply has continued into the present except in New Jersey and Rhode Island.

In recent years, however, new pressures have cast the state governments in more dynamic roles respecting water supply. Continuing population and industrial growth and increasing per capita demand have given rise to ever larger scale development, while local supplies have become more fully utilized. Certain sources remain to be tapped, but are increasingly competed for by various water supply systems. More dramatic has been the growing nonsupply demand for water resources. While navigation, power and irrigation continue their claims upon the states' waterways, the demand for recreation and environmental protection is producing a still greater challenge to water needs.

Until recently the large central city or metropolitan agencies have been constrained from tapping distant sources only by their technological or financial resources (and delays caused by court resolution of interstate riparian issues). Now, in many cases, their reach has extended to the potential sources of other users. Even where their proposed development is far from the likely sources of other water supply systems, the large suppliers are confronted by recreators and environmentalists determined to prevent further disturbance to rivers and natural areas.

Many small towns or districts also face not only opposition from local conservation groups, but also the problem of competing for development of larger, more distant and costlier sources. Those small suppliers who recognize the desirability of joint action with neighbors are often frustrated in attempts to achieve regional cooperation by potentially important participants who are well supplied, think they are well supplied, or are simply reluctant to embark upon a joint venture water supply development.

As a result of these growing constraints on local suppliers, states in the NEWS area are increasingly becoming important as to both geographic and political aspects of regionalization. The geographic scope of many of the projects identified by the engineering studies is encompassed by states, except for some projects involving the major interstate rivers (Delaware, Connecticut, Merrimack, Taunton and Hudson).

For projects for which the state does provide a suitable geographic region, there are great advantages of having an established governmental base on which to build water resource management capability. New York, New Jersey, and Massachusetts have recently created environmental affairs or natural resource departments which incorporate most water-related functions; Connecticut has initiated a comprehensive water study, and the state government in Rhode Island is taking the lead in an effort to restructure water supply management along regional lines within the state.

In Rhode Island, most of the relevant projects listed in the NEWS draft engineering report are incorporated in the state plan. The state

Water Resources Board there is cooperating with the Providence Water Supply Board to facilitate its expansion as regional developer and supplier, and is empowered to require intercommunity arrangements throughout the state.

New Jersey has gone farther than the other states in including former powers over water supply of the Health Department in its relatively new Department of Environmental Protection. New Jersey is one of the few state governments in the nation to have itself undertaken the development of water supply. Responsibility for construction and operation of the Raritan reservoirs is a line function of the Division of Water Policy and Supply within the Environmental Protection Department of state government.

The Metropolitan District Commission (supplying about 42 percent of water consumed in Massachusetts in 1965) is a state instrumentality. Also, Massachusetts is in the first stages of a gradual reorganization toward creating an environmental department. New York has recently created such a department. In neither of the two states is it yet clear what effect the new departmental structure will have. In New York, the state Commission on the Water Supply Needs of Southeastern New York is preparing recommendations relating to both project and institutional developments.

Even though the state may not provide a suitable geographic unit of management for some projects (i.e., interstate projects and the smaller intrastate projects), it nevertheless remains a prime source of political authority that must be accommodated by whatever regional management

structure is established. The states are, according to judicial precedent, the parties at issue in water allocation decisions. The states and their subordinate governments handle myriad water-related grants from the federal government. The states retain a lead role in pollution abatement under federal water quality legislation and administrative decisions.

Bonds issued under conditions set forth by state constitutions and statutes account for the overwhelming portion of water supply capital finance. Even federal loans to municipal and metropolitan agencies for this purpose would be subject to many of the state and local restrictions and procedures relating to indebtedness. Finally, any new supply facility created in the NEWS region must either arrange for use of storage capacity by state or state approved distribution agencies, or must enter into contracts to sell water to such agencies. All of these factors underscore the degree to which state involvement in systematic bargaining processes is essential to creating regional decision-making capability, unless there were to be fundamental reallocations of financial and legal responsibilities in the federal system.

The most compelling factor, however, is the growing number and strength of voices opposing certain types of water supply projects. In all five NEWS area states there is increasingly effective activity by river and park advocates, conservationists, defenders of ecological balance (the effects of many water supply proposals are uncertain and subject to dispute among experts), recreationists, groups resistant to bond issues, and landowners in source areas. In most instances, such groups have not formed

stable or uniform coalitions. But in differing combinations they generate serious opposition to nearly every major project proposed (particularly reservoirs and diversions but including floodskimming and well fields). The state political systems are central arenas for the complicated trade-offs required to resolve these issues. As in other functional areas, interests which lose at the state level turn to the federal arena for another try. However, if all interests bypassed the states to bring pressure on the federal level in the first instance, Congress and the federal agencies concerned might find themselves in increasingly uncomfortable positions. The desirability of altogether bypassing political conflict within the states, therefore, although initially tempting, dims upon reflection.

For the most part, interstate agencies also rely upon direct negotiations among the state participants (governors or their representatives) to resolve important conflicts.

Hence, one important dimension of regionalization in the NEWS areas is improvement in the decision-making and management capabilities of state government. The structural changes now taking place within the states can at best be only the beginning of a solution for water resource problems. The interrelated problems of water development for all purposes have yet to be fully comprehended, nor have the necessary conceptual and administrative tools been devised for the identification and analysis of issues, and for coping with risks. There is no doubt that the needs for and claims upon scarce water resources by potential users will continue to grow, and political conflict related thereto is likely to increase commensurately. In part,

this conflict and its concomitant delays and compromises reflect the democratic process for defining value schemes, but political opposition to proposed water supply projects is often based on unfounded fears or fears related to uncertainty, some of which could be abated by credible, factual presentation by responsible, multipurpose-oriented public agencies. Intelligent planning and decision-making also demand more thorough factual investigation and more sophisticated analysis of objectives and costs than currently is being realized. There is an assumption common among operating water agencies that the less information disseminated, the lower level the opposition that will be encountered. This is reflected in a tendency to avoid publicity and wide consultation with potentially opposing groups until project designs are well formed and ready for formal proposal. Evidence from past and current controversies belies this perspective. Direct study of the environmental costs, exposition of alternatives and early consultation could (and have) dissipated a good deal of opposition and made satisfactory compromise easier to devise.

In all of the states, the means for resolving political disputes are inadequate. While political conflicts can be lessened by the intelligent presentation of facts-- including balanced assessment of social costs-- there remain genuine conflicts of interest which require machinery for resolution. Yet in each of the states, there has been a tendency to proceed with water supply plans as in the past, only to discover very late that heated opposition from other users or environmentalists can obstruct or ultimately defeat those plans. Usually such disputes find their way

into the legislature where individual legislators lack staff or personal knowledge, or else are uninclined, to sort out the misimpressions and rhetoric from legitimate popular grievance. In all of the states, source area-service area conflicts have shown a tendency to stalemate.

In those states where private water companies play a strong role, important regulatory powers are vested in a public utilities commission. Usually these powers focus on pricing, but in some cases ambiguity of laws and administrative responsibility respecting allocation and system design results in an unclear division of actual authority between the commissions and the agencies more broadly concerned with water supply planning and regulation.

Finally, in general, water supply issues in the NEWS area, except in times of crisis, have little public visibility. The problems of water supply receive little attention from state political leaders. In many cases the political influence of a legislature in water supply results as much from the governor's abstention from exercising his potentially formidable powers as from the inherent strength of the legislature itself. In turn, the relative restraint of gubernatorial action weakens the state administrative machinery responsible for managing water supply and other water resources problems.

Interstate Organizations

Another dimension of regionalism is, of course, interstate. In the field of water resources, existing interstate arrangements generally

are either tailored to planning for a river basin (or set of basins), or compacts directed at specific bistate joint ventures.

The major river systems in the Northeast are now or shortly will be provided with commissions of some type with the exception of the Hudson for which compact legislation has been pending for years. The Delaware River Basin Commission, New England River Basins Commission and Great Lakes Commission provide existing regional frameworks with varying roles. In addition to participation in these agencies, in recent years the state of Connecticut has been involved in at least two regional studies and four interstate compacts related to water management; Massachusetts, in at least two regional studies and four interstate compacts; New Jersey, in at least one regional study and one interstate compact; New York, in at least five regional studies and five interstate compacts; and Rhode Island, in at least one regional study and one interstate compact.⁵ The web is indeed a tangled one.

The compact-based commissions could, in the future, exercise important powers that might be delegated by state and federal governments. They can take on implementing roles for regional supply projects. The DRBC, for example, has not utilized its power to issue bonds, but has developed cost-sharing arrangements for water supply storage planned for Tocks Island

2. Daniel H. Hoggan, State Organizational Patterns for Comprehensive Planning of Water Resources Development, College of Engineering, Utah State University, 1969.

and would manage the wholesaling of such supply. Even when other alternatives are selected for regional project development, these agencies are participants in the required bargaining processes. The DRBC, for example, can regulate discharges and has review powers over all project proposals in its basin. In addition, it handles basin-related grants from EPA as well as working on joint plans with six other federal bureaus. Despite its substantial authority, however, it does not represent an independent level of political power for resolving conflicts. In cases of real conflict, decisions by the compact organization usually depend upon state-federal negotiations, often throwing the issue back to the governors and high federal officials.

The NERBC is not a compact organization, but a commission created by executive order of the President under terms of the Water Resources Planning Act. It lacks the key powers of the compact agencies and has less potential to benefit from delegation of state powers. Nevertheless, the NERBC has earned a favorable reputation in its short existence and is a prime candidate for becoming a focus of negotiations for regional project development. The flexibility afforded by its framework-- in contrast with compact agencies-- has distinct advantages. It can define its priorities and program according to discernible opportunities and areas of consensus over time.

Federal Roles

Thirteen federal bureaus operate water-related programs in the Northeast. In addition, NEWS, the Water Resources Council (WRC), the

Office of Water Resources Research, and the U. S. Advisory Commission on Intergovernmental Relations have all sponsored studies of project and institutional alternatives in this region.

Most federal roles can be classified as one of two kinds: direct action carried out by federal regional or local staffs; and grants, regulation and other supporting functions for activities carried out by state and local agencies. (E.g., planning studies sponsored by WRC have been carried out by state, local and interstate agencies; planning studies of NEWS have been conducted by the Corps of Engineers (COE) and its direct contractors).

Federal direct planning activities have long been useful to other participants. The DRBC plan for the Delaware, for example, incorporated aspects of earlier COE basin plans (as did the New Jersey state plan as well). Prior to the NEWS legislation, however, most federal activities bearing on water supply were indirect (supportive of management carried out by instrumentalities of other governments). Examples of the indirect roles include HUD grants to localities for water supply and sewerage projects, and EPA pollution standards and abatement grants. Under the Water Supply Act of 1958:³ costs of federal projects attributable to water supply are fully reimbursable; prior to construction, reasonable assurance must be obtained from state and local agents that such reimbursements will be subscribed for (this can be relied on only up to 30 percent of the costs of

3. 43 U.S.C. 390B.

the federal project); and the water supply operations of the COE are expressed statutorily as part of multipurpose reservoir projects. Tocks Island is planned to be carried out under this statutory framework, aiming at the largest single increment to water supply currently authorized in the Northeast. Bureaus of the Department of the Interior have long been involved in assistance and demonstration projects for ground water development and now for new water supply methods.

The NEWS legislation opens the option of direct federal public works for single or major purpose supply projects, nonreservoir projects (e.g., floodskimming), with partial or no state-local reimbursement. These kinds of projects in the Northeast could be authorized by public works bills in Congress with or without revision of the 1958 Water Supply Act, depending on the reactions and interactions of the Public Works, Appropriations and Interior Committees of Congress.

Instead of (or in addition to) federal movement into a direct role for single purpose water supply projects, another approach to expanded federal activity may be foreshadowed in moves by the federal government to stimulate environmental protection and multipurpose resource planning approaches, and to improve state management capabilities. This report was asked to emphasize water supply and not primarily other aspects of water resource development, but the intensification of interdependencies among supply projects and other land and water uses, and the increasing sense of crisis with respect to environmental damage have stimulated new presidential and congressional charges to the water quality agencies and the COE with

respect to pollution abatement and sewage treatment that cannot be ignored. They underscore the potential for federal support for, or implementation of, comprehensive river basin projects that might tie together supply and quality improvement or support supply projects with minimum environmental costs.

Hence, there are clear potentials for expansion of federal roles in regional water supply development. That there are also limits to the potential federal decision-making role is implied by the earlier discussions of other existing instrumentalities. This finding is also predicated on the fact that there is not a sense of any impending water supply crisis among the public, the leadership or, even, some supply agencies-- despite delays imposed upon their project plans and despite the drought of the early 1960's.

The federal government is not limited by the United States Constitution in its ability to take over water supply functions. Typical evolution of federal concern is summed up as follows:

As a major internal problem develops . . . public attitudes appear to pass through three phases. As the problem begins to be recognized, it is seen as local in character, outside the national concern. Then, as it persists and as it becomes clear that the states and communities are unable to solve it unaided . . . the activists propose federal aid, but on the basis of helping the states and communities cope with what is still seen as their problem. Finally, the locus of basic responsibility shifts: the problem is recognized as in fact not local at all but as a national problem requiring a national solution that states and communities are mandated, by one means or another, to carry out-- usually by inducements strong enough to produce a voluntary response but sometimes by more direct, coercive means. . . . In matters relating to the fundamental nature of society-- educational and economic opportunity for all citizens,

equal rights of all, the quality of the human environment, health, welfare, housing-- the country has been moving rapidly into the final phase.

There are no longer any constitutional barriers to the assertion of federal responsibility.⁴

However, barring complete federal takeover in time of crisis, the realities of water supply force federal decisions into pluralistic bargaining processes by virtue of the fact that source development must be adapted to the needs and preferences of the instrumentalities that control transmission and retail services. In addition, of course, the same complex of politically expressed interests confronting state and local agencies would be directed at federal implementing agencies and authorizing committees. Our interviews indicate little favor at the present time within the region for a major expansion of federal direct involvement in water supply per se. This climate of opinion could shift dramatically, of course, with recurrence of severe drought or continued delay of projects planned by existing agencies.

There is, in any case, potential for federal water supply production and wholesaling in some circumstances (e.g., where other approaches produce stalemate, where major interstate-interbasin transfers are needed, or where projects involve important experiments, risks or demonstrations).

At minimum, whatever specific organizational framework is selected for future regional water supply project management, special federal efforts

4. James L. Sundquist and David W. Davis, Making Federalism Work (The Brookings Institution, 1969), p. 11.

are needed to improve the capacity for continuous multifunctional and multi-objective planning and to resolve interstate source conflicts.

The federal government is partly responsible for the presently fragmented and fairly ineffective water resource and water quality planning that does take place. Unrelated grant programs have stimulated the creation of unrelated planning staffs among operating agencies, states, the basin commissions and federal agencies. Direct water supply planning and construction activities under the NEWS legislation could not overcome this difficulty unless COE planning staffs were authorized for permanent regional coordination assignments and their relations with state, metropolitan and other federal agencies further spelled out. If the Water Resources Council were expected to overcome this difficulty, its staff and powers would have to be strengthened.

If long-term organizations were desired within the states, substantial federal planning support could be made contingent upon creation of consolidated planning agencies empowered to (1) prepare, revise and monitor comprehensive water resource plans, including recommended supply project priorities and assignment of financing and implementation responsibilities; (2) approve water source allocation and transmission permits; (3) fund and review counterpart substate feasibility planning; (4) maintain liaison with federal and interstate agencies-- including all compacts and river basin commissions in which the state participates.

The federal government has authorized a method for regional coordination in the Demonstration Cities Act of 1966, Intergovernmental

Cooperation Act of 1968, and National Environmental Policy Act of 1969, together with Office of Management and Budget Circular A-95 (February 9, 1971). This system encourages a regional review process for proposed projects of all types relating to metropolitan or regional development. It has encouraged regional planning activities by designating certain planning agencies as review clearinghouses. The limitations are severe, however. The federal agency entertaining grant applications is not required to follow the advice of the review clearinghouse. There is little funding for in-depth reviews. And there are not widely accepted, operationally formulated regional plans against which projects can be measured. At least, however, the clearinghouses have early information on a wide range of project proposals and grant applications that contributes to informal efforts at intergovernmental coordination. The Tri-State Regional Planning Commission, operating for the New York metropolitan region, is the only interstate clearinghouse in this system. Water-related agencies in the region could support special planning-coordinating efforts through this framework, particularly if federal staff and other types of aid were provided, and if federal incentives for operational plan preparation and adoption were instituted.

Finally, new approaches to problems of interstate water allocation are needed and may be implied by recent judicial decision and legal interpretation. The traditional methods of resolving interstate conflicts of this type-- long, drawn out, interstate negotiation ending in agreement by compact or decision by the Supreme Court-- are unsuitable for several

reasons. They are rigid; judicial decisions and interstate compacts are difficult and costly to modify when needs and conditions change. When one is reinforced by the other-- as in the case of the DRBC compact in which the states seemingly waived rights to rechallenge the court decree of 1954-- a serious obstacle is created to flexible planning and selection among alternatives proposed by the NEWS engineering studies. Moreover, allocation decisions on judicial grounds have not taken full cognizance of efficiency and environmental factors, nor are they settled in advance of need in order to facilitate staged development. Ways to provide systematic approaches to, and timely resolution of interstate issues relating to water resources should, therefore, be a priority concern of the Congress.

Differential Impact of Regional Alternatives

The discussion thus far should have revealed to the reader that no regional alternative can be considered neutral in terms of the existing participants. This is relevant not only in terms of the political feasibility of organizational alternatives but also in terms of their desirability. Existing institutional frameworks-- old and new-- represent investments in administrative development that cannot be discarded or bypassed without some cost in human, financial and political resources. In addition, criteria for assessing regional alternatives include some values attributed to certain institutional characteristics (i.e., balance in the federal system and representativeness of decision-making).

Most important, one cannot predict the effect of any organizational alternative without assessing its impact on the significant actors in

the relevant policy systems. A structural change modifies the rules to which individual, group and agency behavior must conform (assuming rule enforcement). It shifts the relative assets and liabilities of each actor-- increasing access of one group over another, giving one set of officials or another additional tools and inducements to use in the intergovernmental bargaining processes. Structural change, therefore, modifies the tendencies of the system. But predictability of the direction and intensity of such modification is extremely low without full information on likely response of the sociopolitical units affected.

In the case of the water supply policy systems, several categories of actors are key in this respect: operating agencies; state governments; conservation-recreation interest groups; supply-engineering groups; and federal officials. First, it appears at this juncture that large existing water supply instrumentalities would oppose being divested of their functions (unlike, for example, existing instrumentalities which carry out welfare programs). Unless perceptions of serious need become heightened, many of them are likely to withhold cooperation from new organizations attempting to wholesale new supplies unless the wholesale price reflected substantial monetary savings (which in most cases would require subsidies from the supplier) or projects were adapted to their preferences.

General state government officials have manifested increasing interest in this activity, through establishment of the natural resource-environmental "umbrella" departments, support of planning operations and other measures. However, if they are much more beleaguered than at present

by source area-service area conflicts, conservationist-consumer conflicts, etc., they may be increasingly willing to shift some powers to new or to federal structures.

Conservation, recreation and competing-use interest groups feel they have low access to existing water supply agencies, which they consider to be overly single-minded, for the most part. These groups have supported creation of environmental departments in the states. They are not convinced that federal public works agencies would design supply projects from an objective multipurpose perspective. They are often more able to delay or block projects in some of the states than in the federal arena, though federated groups, such as the Sierra Club, exert influence nationally. These groups are fragmented and their interests frequently conflict as to specifics (e.g., river-based groups oppose floodskimming while wildland protectors oppose reservoirs), but informed and balanced influence by conservation and recreation groups is vital to equitable and economically sound public decisions in this realm.

Another category of interest groups that will influence the outcome of various regional approaches might be labeled, for want of a better term, the supply-engineering groups. Encompassed here are construction contractors and their associations as well as engineering consultants. These groups tend to be supportive of existing public works approaches for the most part. Shifts which reduce the present dependence of the operating agencies on engineering consulting firms would be likely to broaden the scope of planning and to some extent increase opportunities for multiple

means, multipurpose assessment of projects. The consultants' report is now a key weapon of policy and intergovernmental battles. For example, state hearings on New York City's request for rate increase are recessed while the suburban parties contract for a study to answer that prepared by the city's consultant. In New Jersey, a consultant's report was one of the biggest guns wielded by a private water company to entice subscribers from the district commission alternative. The plethora of inconsistent reports is creating a credibility gap with respect to engineering estimates of all types. IPA's interviews turned up frequent commentaries that one agency's engineering consultants could produce figures that would cast doubt on the accuracy of demand, yield, flow and cost projections of another's.

Finally, because the federal official establishment dealing with water issues is fragmented, an increase in federal involvement cannot be equated, per se, with an increase in policy streamlining. Fragmentation cuts across both the executive and the legislative branches, some committees and agencies having important environmentalist constituencies, others having dominant supply-engineering constituencies. However, recent charges to the COE relative to pollution control, sewage treatment, and multiobjective planning may form the basis for more comprehensive federal approaches. Moreover, the appropriations subcommittees of Congress have shown an interest in limiting the environmental opportunity costs of public works projects and stimulating followup to Senate Document 97 calling for multiple purpose justification of work proposals. The Water Resources Council would have to

exercise fuller review powers than it has to date if it were expected to lead the process of trade-offs among relevant purposes at the federal policy level.

C h a p t e r 3

ALTERNATIVE COMPONENTS OF A REGIONALIZATION PROCESS

The discussion thus far yields the conclusion that regionalization of water supply in northeast United States cannot be realistically viewed as an effort to integrate all major powers with respect to that function in one or several specially tailored or selected institutional structures with broad jurisdiction. The concepts of integrated hierarchy or autonomous authority to consolidate control and maximize internal efficiency simply do not fit this pluralistic situation. Unity of command is neither feasible nor desirable in such circumstances.

This point is illuminated by contrast with the situation in the Tennessee Valley when the TVA was created to assume broad consolidated functions, many of which had not been previously performed, in a largely agricultural region. In the Northeast we are dealing with a thickly settled, urban-industrial region in which water uses and agencies are highly developed and deeply vested.

All reasonable regional alternatives for NEWS represent additions to, or modifications of what will remain a pluralistic system. The net costs of trying to integrate the myriad local supply and distribution systems, among many of which the interdependencies are remote at best, would be enormous, even viewed from a theoretical standpoint. Furthermore, complete integration would reduce the capability of the system to innovate and to adapt to local variations. Finally, short of sweeping shifts in

congressional policy to take precedence over provisions of state constitutions and statutes, and court determinations, full integration of existing water supply functions is not likely on legal grounds.

The issues can be narrowed, then, to: (1) seeking promising alternatives for providing new regional supplies and coordinating their management with existing distributors; and (2) improving planning, decisiveness, management and coordination in the pluralistic water supply arena, at least to the point where most multiple purpose, multiple means factors are systematically considered at regional levels. This focus does not rule out major modifications in existing agencies. It merely stresses that whatever changes are made, there will remain a considerable number of governments and agencies involved, so that decisiveness, for example, will depend on speeding and improving interactions among instrumentalities, not upon unity of command. It is possible, and desirable in many instances, to sharply reduce the number of instrumentalities involved. Various and sundry mayors, legislatures, governors, bureaus, courts, interest groups and associations will, however, still be engaged in major decision processes.

Hence, regionalization in the NEWS context should be viewed as a process, a process of creating and intensifying systematic linkages among water supply subsystems in large interstate areas. Regional linkages among subsystems can include three types of transactions: (1) authority-based transactions or formal rules (e.g., give a central agency review and veto powers over projects of other agencies); (2) information-carrying

transactions (e.g., coordination of plans, shared planning staffs, central distribution of technical services, regular interagency consultations); and (3) bargaining transactions (e.g., raising the bargaining powers of a key participant by provision for subsidy or by assuring it assets of the first two types [superior authority and superior information], and/or setting deadlines and agenda for negotiations).¹

The fundamental first issue raised in identifying alternative approaches to regionalization in the NEWS context is an issue of intergovernmental relations. Thus, the illustrative arrangements described at the end of this report represent different patterns of intergovernmental partnership for regional water supply.

For any selected intergovernmental emphasis, a range of structural prototypes (line agency, independent authority, intergovernmental commissions, special district, etc.), can be conceptually viewed as one set of alternative components. Again, choice among these is a further step in designing a process according to pre-selected goals and intergovernmental emphases. The alternative structural prototypes can be considered interchangeable parts for organizational design. Thus, an independent authority is a component that could be used to enhance and consolidate federal power, to insulate local power, or to structure relations among several

1. Annual budget requirements are traditional sources of agenda and deadlines for certain types of public debate, setting some limits on decision delays and stalemate. In the case of water supply development, a counterpart process would have to be designed, such as formally adoptable plans with targeted investment schedules.

governments that might control its board, depending upon the intergovernmental pattern to which it is tailored.

Cost-sharing options can also be viewed as a separate set of organizational variables that can be utilized in several different intergovernmental patterns. Grants, loans, bonds, initial financing with various proportions of reimbursement, etc., are a third set of alternatives to be considered in designing a regionalization process.

Not all structural prototypes and cost-sharing arrangements are compatible with all forms of intergovernmental partnership, of course. Use of a council of state and local governments to oversee regional projects, and full reimbursement of federal financing are not compatible with an emphasis upon a federal direct role, for example. That emphasis is, however, compatible with more than one of each type of structural component.

Below are cataloged in summary fashion structural prototypes and cost-sharing options from which selection can be made. None of these are ends in themselves. How they will actually affect decision-making will depend on how they fit into the overall process, and how the relevant human individuals and organized groups behave within and toward them. Finally, the way in which the resultant process changes themselves are to be judged depends upon selection of criteria, which are set forth in the subsequent chapter of this report.

Structural Prototypes

The following table lists some of the structural devices that might be utilized at a regional level of jurisdiction to develop new water supply sources. The table indicates the category of structure, the government or governments upon whose authority it is likely to be based, and implications for methods of financing, where relevant.

Federal Field Staffs

Federal line agencies can be adapted to regional jurisdiction. The geographic reach of regional or district offices can be adjusted to meet functional regional needs, and staffs permanently assigned to those offices to carry out specified regional functions (running the gamut from planning, technical and information services, advance land acquisition, project development, to implementation and maintenance). Some trends in this direction have been developing in the Departments of Labor and Housing and Urban Development.

This type of approach to regionalization is likely to emphasize the political leadership of the substantive and appropriations committees of Congress, local congressional delegations and the federal executive branch. The extent to which the device bolsters the federal role in the intergovernmental partnership, of course, depends upon the functions assigned to the regional staffs and their relationships with state and local government. Regional staff planning or approval of grants-in-aid, for example, would have different impact in this respect from regional staff execution and management of projects without state or local review.

STRUCTURAL PROTOTYPES FOR REGIONAL JURISDICTION

Structural Category	Likely Sources of Authority	Implied Financing Sources
Federal Field Staff	Federal	Congressional Appropriations; Revolving Funds
State Line Agency	State	Appropriated Tax Revenues; State General Obligation Bonds; Federal Grants; Various Reimbursements
Corporate-Type Public Authority	Federal; Interstate Compact; State and/or Local	Revenue Bonds; User Charges; and/or Supplementary Subsidies from Appropriated Tax Revenues
Intergovernmental Associations (Commissions, COG's, Etc.)	Interstate; Inter-local	Contributions of Member Governments; Grants
Extraterritorial Jurisdiction	Local	General Obligation City Bonds; Tax Revenues; Federal Loans and Grants; User Charges
Metropolitan Government Line Agency	Local	General Obligation Bonds; Tax Revenues; Federal Loans and Grants; User Charges
Special District	State and/or Local	User Charges; Benefit District Taxes; General Obligation Bonds
Contracts (Interchange of Staff or Services)	Federal, State and Local	Revenues of Contracting Parties

Federal government procedures are such that there are definite limits to the degree of decentralization possible within this framework. For example, public works project authorizations would come out of Washington, D. C. Hence, the extent to which this approach can be expanded to encompass nationwide water supply functions may be limited eventually by decision-making congestion at the top. Annual appropriations would be relied upon for most costs. Limited purpose revolving funds could facilitate site and equipment acquisitions. The provisions of the federal Budgeting and Accounting Procedures Act would apply (including GAO disallowance) as well as general statutes on contracting and land purchase.

This is a prototype, however, that is highly flexible as to selection of boundaries and can readily supplement other devices. To make it work effectively, the actual operating relationships between the federal offices and competing or dependent state and local agencies should be carefully considered and spelled out to the extent possible.

The Authority

The generic term, "authority," encompasses a vast range of possibilities. Included can be a federal corporation with limited jurisdiction (e.g., TVA); an interstate compact organization (the Port of New York Authority); an interstate-federal compact organization (e.g., the DRBC, which, although titled a river basin commission is authorized to float revenue bonds and otherwise behave as a corporate-type authority).

At the state level, public authorities are corporate entities authorized by legislation² to construct and operate revenue-producing facilities outside the regular structure of state government, generally with greater administrative autonomy than federal corporations.³ They are not empowered to levy taxes, but do float revenue bonds, and generally can repay debt at more liberal installment terms than government agencies. Increasingly they are subsidized by state loans of funds, personnel services or equipment. An example is New York's Environmental Resources Corporation, to construct and operate pollution abatement facilities. Tax funds may also flow to them through state or federal grants⁴ or earmarked taxes levied by state or local governments (e.g., user district taxes).

Many public authorities are exempt from state and local regulatory bodies in contrast to privately organized utilities. They have considerably greater freedom to hire and promote personnel than line agencies.

An open-ended or holding company authority can take over or establish subsidiaries over time. This might be particularly useful for

2. Legislative procedures vary. In New York, state legislation has been required since 1938 to establish public authorities. In New Jersey, state law enables county and municipal governments to create them. The Suffolk County Water Authority-- created in 1934-- is New York's only locally authorized authority.

3. There is no single, comprehensive legal definition. In New York State, for example, the Public Authorities Law is a conglomerate of special acts. Other authorities may be organized under terms of other laws (e.g., Public Housing Law). A "public benefit corporation" is defined as a "corporation organized to construct or operate a public improvement" with any profits accruing to the state or its people.

4. The federal Intergovernmental Cooperation Act stipulates general policy that loans and grants be directed at general governments rather than at special purpose units barring compelling reasons.

incremental consolidation of small urban water systems. New York State has a lead in this approach, in transportation (the Metropolitan Transportation Authority and the Niagara Frontier Transportation Authority) and housing fields (Urban Development Corporation).

Mixed corporations (with both public and private participation), and intergovernmental corporations have been utilized to date far more extensively in western Europe than in the United States and promise to be increasingly popular here. Boards of directors can include appointees or ex officio members of several governments (federal, state and/or local). Amtrak and Comsat are examples of corporations with federal government representation on the board. Compacts, statutes and charters establishing such corporate authorities can specify allocation among the participating governments of any operating deficits incurred as well as other financial relationships. By definition the authority would have its own borrowing powers. The current legal limitation upon use of mixed corporate forms at state and local levels is state constitutional prohibitions against public aid to private organizations. There are exceptions, however, and in some instances public authorities could own stock in mixed corporations (an example being subsidiaries established by New York's Urban Development Corporation with up to 49 percent private subscription).

Debates have been long and shifting as to whether "businesslike independence" and isolation from "politics" are major assets or major drawbacks of the authority form. However, the usefulness of the authority

device need not depend upon whether one puts one's faith in businesslike independence or on representative politics. The authority device can be designed to incorporate a high degree of responsiveness to political authorities, a high degree of insulation, and myriad permutations in between. Its distinguishing features are its separate corporate status, its ability to float revenue bonds and inability to tax, its exemption from existing government debt limits and civil service structures.

Under existing law, the federal corporation has limited independence. The Government Corporation Control Act applies some reporting and audit procedures of the Office of Management and Budget, the congressional appropriations committees, and the Government Accounting Office. Nevertheless, where the type of enterprise to be engaged in is distinct, several managerial advantages can be obtained through use of the federal corporation. Only excess of corporation expenditures over revenues is classified as budget expenditures; otherwise user charge revenues can be retained and applied to expenditures without special legislative appropriations. Corporate bonds may be floated with or without United States credit. Simpler land acquisition procedures can be utilized to acquire property in the corporation's name than are necessary to acquire property in the name of the United States government. The corporation determines its accounting system and GAO annual audit is a survey type.

Congress can, of course, exempt a particular corporation from the control act, or tailor a special instrumentality (as in the case of

the postal service). A holding corporation with some private capital, for example, would be exempted from annual budget submission.

Corporations are not immune from politics, however designed. They may be subject to a distant brand of politics; for example to the influence of bondholder interests, employee groups, or particular client groups rather than of local officials or party organizations, depending upon the pattern of dependencies in which they operate.

Special Districts

A special district is another highly flexible type of instrumentality, usually with taxing power and statutorily limited functions. In 1967, there were some 500 single purpose water supply districts in large metropolitan areas of the United States. Like corporate authorities, special districts generally are outside the financial limitations and referenda requirements of general purpose government. Some are subject to civil service regulations and governmental collective bargaining contracts; most have distinct personnel systems. Special districts are generally local or state instrumentalities of which the geographic jurisdiction does not necessarily correspond with that of general purpose government. (In fact the service area can be flexible, as in the case of the Metropolitan District Commission serving the Boston area.) Most of them are controlled, however, by municipal governments.

Water districts are often mainly methods of financing local water operations, established by towns in order to levy special benefit assessments or ad valorem property taxes earmarked for the water service.

Intermunicipal water districts have been widely used in Europe. Like corporate authorities there, special districts have frequently been more closely integrated with general government than in the United States. For example, water districts in France are governed by boards representing the legislatures of the participating local government; their budgets are subject to governmental approval; and their capital financing depends largely on government grants.

Intergovernmental Associations

This category includes noncompact river basin commissions (at a federal-interstate level of authority) and councils of governments (usually at a state-local level of authority). This type of device has generally been directed at initially informal and open-ended opportunities for intergovernmental cooperation and coordination. The flexibility of intergovernmental associations is particularly useful in a field like water resources that is already crowded with official participants. It is particularly suited to increasing the information and bargaining transactions in a regional system. Without either the taxing powers of a special district, the user charges and revenue bonding power of an authority, or the decision-making authority of a general purpose government, it is unusual for an association of governments actually to resolve important conflicts among members, however, and this type of device has a very mixed record when relied upon to solve basic problems.

The major activity of metropolitan councils of governments to date has been to promote and channel intergovernmental communications, which

is an important function. Success at this level should not be taken, however, to signal likely capability to decide upon and carry out regional projects. Most of the intergovernmental councils are not directed to operational purposes, and the common practice of seeking consensus (in some cases even unanimity) is a decided limit on the scope of the councils' operational potential.

The boards or commissions of such associations are generally composed from officials of participating governments, which frequently retain the right to withdraw or refrain from supporting specified activities. This device can be somewhat bolstered, however, by combination with others such as creation of a corporate-type authority to carry out specified tasks under supervision of a council of governments.

Representative Special Governments

Directly elected government units with statutorily defined functions (not covered by the general municipal and home rule provisions of local government law) represent a variation on several prototypes. School districts are an obvious example in the United States. By virtue of having an independent political base, such units are less dependent upon general governments than are intergovernmental associations, and they avoid the "insulation" of special districts or authorities that do not have a direct public constituency or are not subject to close control by elected officials of general government. This form is relatively untested on an interstate basis. Interstate compacts or parallel legislation would be required

to authorize direct elections within parts of two or more states for a regional representative council.

Contracting, Technical Assistance
and Staff Sharing

To date, the United States government has more extensive experience with these kinds of practical intergovernmental cooperation on the international than on the national scene. Methods of assisting other nations through these devices were developed well before their extensive application to state and local governments was encouraged by federal legislation of 1968 and 1970.

Service contracts⁵ have long been used in water supply at local levels. Los Angeles County is the most frequently cited example of the urban county offering services to localities on a semimarket, contractual basis. City agencies utilize contractual relationships as well to distribute water to suburban municipalities.

The regional water supply system in Detroit illustrates extensive development of contracting procedures. The standard contract used by the Detroit Water Board covers the maximum rate at which the purchasing city may take water from the Detroit system, points of distribution, required metering, rates, inspection and other details. New York City's

5. Water supply has been held by many states' courts as falling within the "business affairs" category of municipal activity (in contrast with governmental affairs), and therefore long-term contracts (exceeding appropriations periods) have been permitted between governments and private and public suppliers.

sale of water to suburban municipalities is not on a contract basis, but is governed in detail by state statutory provisions.

Subscribers by contract are sought by a variety of other types of structure involved in the development or wholesaling of water, including special districts and private companies. The Delaware River Basin Commission will enter into contracts for wholesaling water from Tocks Island, having taken responsibility of giving the federal government "reasonable assurance" that the costs of water supply storage will be reimbursed. It also provides a focused negotiations and agreement process to arrive at cost-sharing formulas among the states involved.

Intergovernmental agreements and contracts are based on state enabling legislation or specific statutory authorizations. All of the NEWS states except Rhode Island have general enabling legislation for such links among local authorities.⁶

The Intergovernmental Cooperation Act of 1968 authorizes and encourages federal participation in cooperative relationships, including federal bureau provision of technical training and other specialized services to state and local governments on a reimbursable basis. These services can include technical studies and plans, preparation of project proposals, information and data processing.

6. Connecticut General Statutes Annotated, §7-339; Annotated Laws Title 7, Ch. 40, §4a; New Jersey Consolidated Municipal Services Act, Statutes Annotated, §40:48B; New York General Municipal Law, Act 5-6, 119.

The Intergovernmental Personnel Act of 1970 authorizes personnel interchange and training grants. Both of these relatively untested legal frameworks offer opportunities for establishing joint federal-state planning staffs for water resources, for example, under the auspices of state natural resource departments, COE regional offices, or with river basin commission sponsorship. In Europe, it is not uncommon to find national government personnel deputed to work groups in regional planning agencies. Currently some state water resource agencies lend staff to local agencies. Or, the COE would provide engineering design, project construction and management services under contract to state and local authorities.

Cost-Sharing Alternatives

The myriad arrangements theoretically possible for allocating costs of water supply projects can also be viewed as a set of components from which to choose in designing an overall organizational system. Two primary issues must be resolved to select among these options. One is the allocation of costs between the user and the public. Another is the allocation of public costs among the governmental participants.

The first issue involves the difference between "public goods," which are provided by governments and paid for by taxes, and "private market goods" which are paid for, in the last instance, by the ultimate consumers.

Public goods may be further distinguished as to "pure" public goods and other public goods. "Pure" public goods are those having the characteristic that benefits enjoyed by one user do not reduce the amount available for consumption by others-- among "pure" public goods are national

defense and the administration of justice. It is necessary to finance "pure" public goods by taxation since there is no way of selling them on the market and no basis for allocating their benefits among individuals.

Governments customarily provide and finance by taxes a number of other goods and services which conceivably might be sold to individuals or firms and paid for by charges but which are deemed to be sufficiently important to the public welfare to justify their being made generally available. Such goods and services, often referred to as "merit goods," include education, highways, health services, and fire and police services.

Finally, there are the market or enterprise-type goods and services which customarily are produced and sold by public or private enterprises.

Prices, the amounts paid directly by consumer users for specific services perform three essential functions. First, they provide funds to meet the costs of providing facilities and services: this is the revenue function. Second, prices tailor the demand for goods and services to fit limited supply, and channel scarce goods and services to those whose ability to pay or demand is greatest: this is the allocation or rationing function. Third, prices have the crucial function of encouraging economical use of resources: this is the conservation function.

There is a case for charging for a good or service, instead of financing it by general taxation, if the following conditions are met:

1. The charge must be administratively feasible. Among other requirements, the service must be measured, like kilowatts, gallons of water, trips across a bridge, or miles traveled on a turnpike.

2. The immediate benefits of the service should go mainly to the persons paying for it. This condition exists when the rest of the community suffers relatively little loss if a potential consumer refrains from using the service because of the charge. For example, the community is ordinarily not much damaged if a person uses less electricity or makes fewer long distance telephone calls, or even if he uses less water. In some cases, a small decrease of use by a few individuals may greatly benefit many others; for example, fewer vehicles on a roadway may drastically reduce traffic congestion.

3. The charge should encourage economical use of resources. Metered charges, for instance, encourage consumers to conserve water and electricity by turning off faucets and lights, particularly for marginally valued uses.

Reasons for Subsidies

Governments often subsidize part of the costs of producing and consuming particular goods and services, making up the subsidies by taxes, in order to encourage production and consumption.

One purpose of subsidies is to support the indirect or spillover benefits ("externalities") associated with a particular good and not confined to the immediate user. Spillover benefits are akin to "pure public goods" in that they cannot be traced for purposes of imposing charges. Urban mass transportation is an example of a service which increasingly is being subsidized because of a wide conviction that it benefits not only the riders but also the economy at large. Shipbuilding is subsidized because of the conviction that maintenance of a shipbuilding industry is important to the national security.

Included in this category of spillover effects which merit subsidization are development of an area, a region or an industry. Thus various forms of transportation-- canals, roads, railroads, airlines-- have all been subsidized in the expectation that they would contribute to the economic development of the areas served thereby. Close analysis of such subsidies often shows that the main purpose of the subsidy is to decrease the risk of the party undertaking the venture, or to enable entrepreneurs to assemble large amounts of capital financing which they might not otherwise command.

Another common use of subsidies is to lower the price of essential goods and services to the poor, as through public housing, food stamps, health services, etc. In such cases, the subsidy is ordinarily limited to goods and services used directly by the poor, for the obvious reason that it would be too expensive to subsidize everybody. With services used by everyone, the needs of the poor are ordinarily subsidized through general income supplements.

With water supply, subsidies to water users could be in the form of lower water prices than would otherwise obtain. Or, there could be subsidies to water producers or distributors which are not passed along to final users. The latter accrue to the benefit of the producers or distributors; such subsidies seldom serve a broad economic purpose, but are found in some current systems.

The reverse of a subsidy is where water charges by municipalities exceed production or wholesale costs and the excess proceeds are used for

nonwater purposes; in this instance the excess charge is equivalent to an excise tax on water.

Water is a scarce resource, costly to produce and distribute. Except for user charges, there is no efficient way of restraining its use, and encouraging households, firms and municipalities not to waste it. Partly because it has tended to be regarded as a free, or almost free, good it is likely to be wasted through inefficient production and distribution facilities or through carelessness.

Water charges, then, under ordinary circumstances, should reflect the direct financial costs of producing and distributing water, with full cost taken to mean either long-run marginal cost or long-run average cost. It is difficult to point to "spillover benefits" which would justify heavy tax supported subsidies for water supply, particularly in view of the growing pressure on public funds by numerous other functions.

The second perspective on cost-sharing-- allocation of public participation among various governments-- is separable but related to the issue of subsidy. Federal or state cost-sharing in water projects may, for example, be limited to initial capital financing with requirement for full reimbursement over a specified period of time, in which case there may be little or no subsidy, depending on interest payment requirements. This is the approach of the 1958 Water Supply Act. Full reimbursement may be ultimately funded through the price of water charged to the consumer, in which case the wholesaling agency is breaking even or making a profit. It is also possible for the wholesaling agency to reimburse fully the federal

government while the retail price of water is not sufficient to cover costs. In this case, state or local tax revenues are absorbing the subsidy. Still another alternative combination would have the federal or state government provide part of the initial capital costs on a nonreimbursable basis. In this case, the wholesaling agency may eventually pass the cost reduction onto the consumer, or profit thereby. Profits of private companies distributing water from New Jersey's state developed supply have been associated with water acquired from the state at less than cost.

Federal nonreimbursable cost-sharing could be designed to induce state and local water supply agencies to select project alternatives favored by federal authorities. The retail price of water to the consumer might still include no net subsidy. In that situation, the federal cost-sharing would in effect parallel an intergovernmental transfer to state or local treasuries. If, however, the federal contribution were used to lower the retail price of water, the problems inherent in subsidy of a marketable resource would be encountered.

Sharing the Public Costs: Options

In looking at alternatives for allocating the public costs of water supply development, we must begin by underscoring the national interest in adequate water supply in the NEWS region. In this federal system, however, the national interest is served by all levels of government. The national interest in law and order has long been served, for example, primarily by state and local governments. So too, in the Northeast, has the national interest in water supply adequate to health and welfare been

served by state and local government. Traditionally, a specifically federal interest has not been defined by Congress for such functions except when the national interest is not satisfactorily served by state and local government. Levels of satisfaction are defined and expressed in this system mainly through political channels.

In the case of Northeast water supply, administrative and political weaknesses of current arrangements are far more potent stimulants to federal cost-sharing than any accepted method of economic analysis. Consider, for example, national income objectives in a regional context. Congress has declared that the national interest requires that future shortages not damage the economy or health of the region. To judge the need for federal action to serve this end, one must ask to what extent such damage is threatened. From the national viewpoint there is little to be gained by inducing industries that are heavy users of water to locate in a given region unless a specific national purpose is served. It is not clear at what point availability of water relative to other services threatens the economic health of the region. There is no evidence that the drought years of 1960-1965 significantly affected aggregate or per capita income trends in the NEWS region. Some firms actually benefited by being induced to adopt water-saving devices and procedures, and even high water-using industries do not cite water supply as a high priority locational factor of the region as a whole, although there are examples of water supply influencing locational choices within the region. Nevertheless, that drought situation was sufficiently critical to seriously worry water supply professionals and elected

officials. It is difficult under these circumstances to assign or measure federal interest in financing margins of safety for local water supply which are greater than provided by state and local officials and legislatures.

(Pollution control is different in many of these respects. Substantial pollution causes general hardship and some economic dislocation, and economic margins of federal interest in abatement can be defined.)

What is clear, on the other hand, is federal interest in improved governmental capacity to cope with drought conditions should they occur, and to make and implement timely decisions.

Under the conditions described there is no established, objective methodology to determine how initial financing for water supply should be shared among levels of government. Cost-sharing in this sense is an issue to be determined by the duly constituted legislative authorities according to social and political preferences.

If Congress finds substantial dissatisfaction with current systems of water supply in this region, it is likely to be dissatisfaction with two aspects: first, with the degree to which multiple water resource uses and pollution abatement are being considered and honored in selection and design of water supply alternatives; and second, with the extent of delay and stalemate encountered in the complex and disjointed pattern of reaching decisions and carrying them out.

This being the case, a federal cost-sharing role might be designed to reduce the environmental costs of water supply projects and to unblock state and local action.

Such a cost-sharing role can be designed by selection among three types of subcomponents: cost-sharing proportions, types of costs to be shared, and fiscal methods of sharing.

Cost-Sharing Proportions. Federal cost-sharing proportions most commonly range from 25 percent to 90 percent. An ascending scale of proportionate sharing could be statutorily defined to meet specified purposes (e.g., to provide incentives for conservation measures, for minimizing environmental costs, for regional organization or improvements therein). There is legal precedent for percentage bonuses to basic cost-sharing formulas for specific actions.

Matching proportions are often required from state government. But in the case of water supply, open-ended provision for the source of counterpart finance would be necessary in order to be adaptable to the wide variation in type of developer in the Northeast.

If a major purpose of cost-sharing were to alter the project preference scales of existing agencies, the federal contribution needed to so induce them may be high, higher than would be desirable by other criteria. This would be the case if existing agencies are reluctant to share control, there is no public sense of water supply crisis, and large water supply agencies have ready access to the bond market.

Types of Costs Shared. Depending upon the nature of projects and the ends chosen to be served, the types of costs selected for sharing might include such varied items as the following:

Initial capital costs of land or supply development.

Initial capital costs of transmission facilities.

Overhead costs of research and demonstration, planning and infrastructure for water resource management.

Financing costs.

Regular operating costs of management and distribution systems.

Environmental opportunity costs, including costs of minimizing loss of recreational and ecological assets and maximizing pollution abatement.

Choice among these targets of cost-sharing will in some instances influence the choice of cost-sharing proportions. Sharing of financing costs does not require statement of specific percentages. For example, the system embodied by the 1958 Water Supply Act represents an interest subsidy by virtue of the delay between initial federal expenditure and the beginning of interest payments by state or local interests.

Thus far, preservation of environmental values has been largely ignored in federal funding arrangements for multipurpose water projects. Exceptions include provisions in the reclamation laws that costs of measures built into water control projects to prevent loss of and damage to wildlife resources need not be repaid by beneficiaries, and that only one-half the cost of facilities for the improvement or development of fish and wildlife resources (including land acquisition) in small reclamation projects is

reimbursable.⁷ In other words, mitigation features are totally federally funded and costs of enhancement features are shared. This approach could be made applicable to a wide variety of water-related projects.

Open-ended cost-sharing arrangements could facilitate a timely process of trade-offs among environmental and consumption values. For example, two plans for a given project could be costed out: one with minimum monetary costs, another with higher monetary costs and lower environmental and/or social costs. The difference could be made eligible for federal funding. This format might provide a useful agenda for bargaining among conservationists and water-use interests.

In addition, water supply development encompasses a variety of different types of projects that are suitable for different types of cost-sharing focus. Desalination and recycling, for example, are at demonstration stages of development, suitable for relatively high federal share to ease risk assumption and to gain technological spinoffs. The federal government is a particularly appropriate agent to promote and finance the research and development of such means, especially because they have national rather than merely regional application. Such an emphasis might favor federal funds being spent to develop techniques of meeting emergency water shortages that are more economical, both as to financial and environmental costs, than conventional reserve capacity in dams and reservoirs.

7. 16 U.S.C. 662 and 43 U.S.C. 442e.

High flow skimming and projects requiring high treatment costs represent cases in which the local agencies are more interested in shared operating costs than capital costs.⁸

Finally, there are cases in which even a high federal share that is limited to the supply development and excludes transmission will not unblock existing stalemates. This could be the situation with respect to distribution of Tocks Island water, for example, if the competition for transmission rights in northern New Jersey continues.

Fiscal Methods. Methods of administering cost-sharing also vary. The most likely alternatives include: loan guarantees, loans and direct expenditure with full reimbursement (suitable for sharing financing costs); direct expenditure with partial reimbursement; percentage grants and/or bonuses for specific performances; annual contributions to operating deficits; and special funds for land acquisition. Federal loans to local agencies would be subject to limitations, substantive and procedural, on local indebtedness.

There is ample precedent for a wide variety of conditions to be attached to federal grants, and in the case of Northeast water supply,

8. The existing system presents manifold idiosyncrasies which would affect the impact of federal cost-sharing. New York City, for example, has no trouble floating water bonds. The city officials see an advantage in raising capital for water projects. Furthermore, financing costs permit real estate tax levies outside the normal limit. Operating revenues are turned over to the city treasury, and the pinched city budget provides operating expenditure. Hence, federal capital cost-sharing is not likely to induce the city to accept a project with high operating costs.

there is great room for improvement of management and policy processes that should be required in conjunction with any federal cost-sharing. Controls and incentives could usefully be designed to bring about more integrated intersystem management, more effective multiple means, multiple purpose water resource policy formulation, and improved conservation.

Cost-Sharing: Summary

The ability of the federal government to influence state-local water policy, and planning and organization therefore, are somewhat constrained by the fact that financing has not yet been a serious problem of water supply in the Northeast, at least with state and large urban governments; water supply bonds are exempted from various restrictions on state and local government indebtedness, and backed by a built-in revenue source--user charges. Sliding over the question of whether federal policy is likely to be "better" than state and local policy, there are several ways in which federal financial assistance, in the form of grants or loans, might influence state and local policy.

1. Advances of funds, even if ultimately reimbursable, can ease the front-end loan in initiating large projects.

2. Advances of funds for acquisition of land needed for potential reservoir sites can preserve much needed flexibility. Advances could take the form of grants or loans with interest deferred until the ultimate use of the land is finally determined.

3. Nonreimbursable grants which enable state or municipalities to hold down the price of water to consumers may have sufficient political attraction in some areas to induce state or local action (though such grants may not be justifiable on economic grounds).

4. Smaller jurisdictions, which typically lack easy access to municipal bond markets, would benefit by federal guarantee, or direct purchase, of their bonds. Assistance of this kind could be particularly valuable in encouraging the formation of substate regional water supply organizations comprised of several local governments who otherwise would be inclined to act by themselves. (Bonds of new organizations are usually hard to sell in the private market.)

5. Probably most important, there is increasing need for integrated financing which covers the entire range of water needs and functions. A demonstration project for the integrated management of an entire river basin, such as the Merrimack or Passaic, offers one of the most constructive opportunities for use of federal cost-sharing.

6. Objection by local governments to public water supply projects which take real estate off tax rolls can be overcome by reimbursing local governments for such losses. There is no economic objection to such reimbursement, but it is likely to encounter considerable political resistance from other agencies and/or constituents who want land for other purposes.

7. Cost-sharing arrangements might be designed specifically to induce better multipurpose planning and management practices on the part of other agencies.

C h a p t e r 4

CRITERIA FOR SELECTING AMONG OPTIONS

Economic Framework for Decision

The economic analysis conducted for this study and detailed in the background materials has spelled out economic alternatives that a decision-making process for regional water supply should consider, and the type of procedures that the planning-decision processes should follow. Conventional financial analysis focuses on efficiency objectives having to do with monetary benefits and costs; a broader definition of benefits and costs should be taken into account.

The following discussion briefly summarizes the type of decision-making for regional water supply (including for selection among project alternatives) suggested by the broader economic analysis. The decision-making process becomes a criterion for judging among organizational alternatives, described in the second section of this chapter; one set of organizational arrangements may be more likely than another to employ an efficient decision process (as the term is used here). It is unlikely, for example, that small, single purpose agencies without major supplementation and reinforcement could undertake a balanced consideration of conflicting objectives and alternative policies ordinarily required for a "good" decision.

Analysis to Deal With Multiple Objectives and Policy Alternatives

Water supply policy and project decisions should reflect some objective weighing of complementary and competing uses of water and

related resources, including alternative land development patterns, ecological relationships, aesthetic values, recreation and conservation uses, power needs, and pollution abatement.

Various means to provide water supply should be regularly scanned, including traditional methods of tapping ground and surface waters, as well as new technologies and approaches.

As alternatives are narrowed, assessment of costs must include consideration of both monetary and environmental opportunity costs. Opportunity costs are values sacrificed by diversion of water. These costs include the lost recreational and aesthetic values of water and stream beds, the value for other uses of land pre-empted for reservoirs (to the extent that these are not included in the price paid for land acquired for dam and reservoir sites), the costs of hydrological changes, and the commercial, recreational or aesthetic value of marine life and vegetation which may be lost by pre-empting or interrupting the flow of rivers or other water.

Insofar as multipurpose projects enhance environmental values which would otherwise lie dormant, environmental benefits which can be efficiently achieved should be added to the benefit of potable water in balancing total benefits against total costs.

Environmental opportunity costs and benefits may be taken account of in several ways. Systematic analysis in a comprehensive planning framework is one. Open political access for the expression of various interests, from consumption to conservation, is another. The two are

interrelated. While ultimate decisions will be made through the political process, that process can be considerably affected by input of systematic analysis and information. It is fairly certain that demand for nonconsumption uses of water and related land will increase rapidly in the future, as rising population, incomes, leisure, and appreciation of the out-of-doors, all push up demand for a fixed supply of resources. An analytical planning effort can help assess the real import of resultant opposition to development projects and thereby aid in achieving consensus.

Environmental opportunity costs are more difficult to analyze quantitatively, however, than are such conceptually measurable costs as construction, land purchase, etc. There are nonetheless a number of devices for coping with their evaluation.

Insofar as they reflect benefits lost, they may be measured in some degree through the device of shadow prices to get an approximation of "market" value. Where market prices are not applicable, benefits themselves may be measured in meaningful units (for example, data on the use of recreation facilities).

In some cases, it will be possible to make decisions between two different projects having the same magnitude of financial cost but substantially different environmental opportunity costs.

In other cases, it may be possible to identify alternative projects, one with a high financial cost and low environmental opportunity

cost, the other with low financial cost and high environmental opportunity costs. In such an instance, the question to be decided is: does the difference in environmental benefits preserved more than offset the difference in financial costs?

In some cases, a comparison similar to that just described is possible within design of a single project, for which it may be possible to preserve environmental benefits by adding to financial costs. In this case the question is again: do the environmental benefits so preserved outweigh the financial costs?

Finally, the decision problem can be somewhat reduced by flexible planning which maintains options and proceeds with subsequent stages only when need becomes clear. This implies, among other things, some constraint in large scale advance commitment of resources to water supply except where there are substantial economies of scale and relatively low environmental opportunity costs.

Coping With Uncertainty

The expansion in the region's water supply system that will be needed to supply future demand depends upon trends of population growth, per capita consumption, and technical developments, and climatic events. All of these are subject to considerable uncertainty. The complexity of the problem confronting water supply planners is, therefore, enormous.

In addition, many existing organizational arrangements produce high rewards for overcapacity and high censure for risk, which further complicates the task. A governmental framework should be sought that

will encourage agency behavior to encompass balanced judgment, adaptive planning, reasonable risk taking, information strategy, and expectation of political conflict and delay.

The costs of supplying large amounts of additional water to various parts of the region are considerable. The costs include: the direct investment in dams and reservoirs, aqueducts and other facilities, all of which involve competition for scarce government funds; environmental and ecological damage, including pre-emption of land-- the supply of which cannot be expanded and demand for which is steadily rising; and the costs in terms of delay and uncertainty in resolving political conflicts, including those expressed by conservation groups.

More information than is presently available is needed to improve projections of water requirements. Population estimates have been found to be highly fallible. Likewise, not enough is known about factors determining water consumption. Why does per capita water consumption vary so substantially in parts of the NEWS region, even after correction for industrial and commercial demand? How may demand projections be affected by different pricing and regulatory policies? The fact that consumption after being constricted during a drought takes a number of years to return to predrought levels suggests considerable elasticity in consumer uses. How much elasticity might be acceptable to consumers and officials?

Current policy that seeks to maintain water supply capacity adequate to provide "safe yield" under conditions of prolonged drought needs continuous review. The difference in costs between "safe yield" and a

"risk policy" can be considered the cost of "insurance water" (excess supply during normal periods providing insurance against shortages in severe drought). "Insurance water" costs are substantial. These costs could possibly exceed the losses to consumers of occasional shortages (the amounts which would be required to compensate fully those damaged by shortages), and they may be higher than the cost of emergency measures to supply water. Such a planning model needs to be adapted, moreover, to expected delays of implementation imposed by political-administrative processes, lest risks be undercalculated.

The best way of coping with uncertainty is to reduce it by improving information, particularly with respect to use patterns and factors affecting them which can improve projections of future demand and implications of accepting various degrees of risk.

Uncertainty can also be reduced by shortening the time required to get new supply systems into construction and operation.

Uncertainty can also be managed by maintaining flexibility--leaving open as many options as possible. One way of keeping options open is by advance land acquisition, which is likely to prove profitable whether or not land is ultimately used for water supply.

Such measures require much better organized planning on an ongoing basis; they require administrative machinery on levels dictated by the geographic configuration of the supply and user areas, whether interstate, state or substate.

For many reasons the tally of costs and benefits cannot be made with satisfying quantitative precision. Benefits are diminished by uncertainty as to whether they will actually accrue. A benefit which has a 50 percent chance of materializing does not warrant as great an expenditure as does the same benefit with a 100 percent probability. For instance, when there is a serious threat of water deficiency, it may be worth choosing a project less advantageous on most grounds than another alternative simply because it is more likely to be implemented quickly.

Uncertain outcomes may be preferred to safer ones, however, if they promise a sufficiently greater reward. Thus, innovation, though risky, may be worthwhile on the chance that it will achieve a valuable result.

When the cost of uncertainty is introduced as part of the choice structure, timing and input of effort and capability become critical elements of choice. Indeed, choice becomes an ongoing deliberative process. Alternatives lose their rigid outlines-- an alternative ranked low today may rank high tomorrow. Immediate action may be put off, for example, in favor of improving information (information concerning engineering and environmental costs and benefits); restructuring the evaluative procedures (considering costs and utilities of marginal increments and providing these increments in other ways); improving the engineering design to meet the new information; introducing innovative alternatives (applicable perhaps to aspects of the total objective); preparing the way for the organizational and political consensus and action essential to final choice.

In a sense, then, unproductive delay commonly caused in present systems by uninformed debate and low visibility conflict should be replaced by deliberative, productive and more generally strategic delays. Of course, problems would be compounded if planning targets were substantially reduced without concomitant improvement in processes of conflict resolution and project implementation.

To summarize: three ways particularly commend themselves as elements of a water supply strategy designed to minimize risks, along with economic and political costs.

The first has to do with projecting demand for water. Population is one element of demand growth, and there is a temptation to make generous population estimates; overestimates are thought to be better than underestimates. With falling birth rates, however, population projections have had to be continually revised downward. To the extent that water demand projections are based on population projections, they should be revised accordingly; many water demand projections have not been adjusted. Also, there is a tendency to extrapolate past trends in per capita water consumption, whereas there is no good reason in fact to expect that past rates of increase should continue. The possibility of affecting water demand through pricing and regulatory policies should also be considered.

Second, it is possible in some instances to play a waiting game, to see if projected water requirements actually materialize before proceeding with construction projects. This requires projects which can be constructed incrementally. The waiting game makes possible a saving in

construction costs, discounted to present values, and may make possible the avoidance of some projects which otherwise would have been carried out.

A third route to economy is consideration of alternative ways to provide water in times of shortage which will be less costly than conventional dam and reservoir projects. Indeed acceptance of some risk may, with appropriate education, be a further alternative. Water from capacity that will be drawn on only, say, once in a century will be vastly more expensive than water from facilities which are used continuously-- so costly as to justify emergency supply measures which may seem more expensive in the short run.¹

1. To get an idea of possible magnitudes of the cost of providing "insurance water," we calculated the difference in present value of future annual costs over a 50-year period, of building two water supply systems identical except for staging.

The first system would provide "safe yields" (at projected demand) during droughts equaling the worst on record, by anticipating the growth of demand and having the new facilities on line in time to meet the safe yield standard. The second system would accept a small risk of running short by timing a new "batch" of construction in such a way that projected demand would be 10 percent higher than "safe yield" before the new facilities began producing. Since "safe yield" refers to extreme drought conditions, the probability of actual shortages (projected demand exceeding yield) under the second alternative is still low, and the risk correspondingly small.

The per gallon cost of providing "insurance water" against the small probability of extreme drought by employing the first alternative is equal to the (1) difference in present value of annual costs of the two systems divided by (2) the number of additional gallons which would be withdrawn from the first system in case of extreme drought. Our computations indicate that cost of "insurance water," so computed, might run 80-100 times the average cost of water, or more.

The computations were based on available data, which are themselves subject to wide margins of error. The computations are therefore intended to present a concept rather than a set of usable planning data.

A wide range of alternatives should be scanned. One set involves rationing demand through the price mechanism, by systematic metering, and by regulations which encourage water recycling and restraint on use for less important purposes. Another concerns detection and control of leakage. Other alternatives include supplying emergency water by means such as desalination, intermittent use of ground water reserves coupled with recharging, improved system interconnections to permit transfer of water from surplus to deficit areas, and recycling. Finally, projects that can be implemented in modest increments-- such as high flow skimming-- are important alternatives.

The present organizational system for water supply in the Northeast imposes serious impediments to this type of orderly planning and implementation of water supply projects. Improvement of both planning and decision-making processes would itself reduce the element of uncertainty and thereby promote economy.

These factors argue for organizational arrangements that sustain ongoing planning processes (in contrast with major project-oriented planning engaged in only at times of pressing need-- often decades apart); that permit nonbudgetary costs and benefits to be displayed in program evaluations; that encourage consideration of geographically and functionally broad range of alternatives; that support timely, incremental decision-making.

Evaluation of Organizational Alternatives:
Summary Criteria

Organizational alternatives for water supply in the northeast United States are expanded by one important factor and limited by another.

They are expanded by the relative abundance of water resources (in general, scarcity limits the number of organizational possibilities). Alternatives are limited by the fact that the Northeast is one of the most heavily urbanized regions in the country, with a long tradition of strong local government and of vested responsibility for water supply, either in municipal or regional government systems or in private systems. As a result there are thoroughly developed local transmission and distribution systems to which any new water supply facilities must be adapted. There is substantial support for existing utilities and for state and local prerogatives.

The following criteria incorporate the aims discussed above, both under the rubric of "Why Regionalize?" (pages 6-10) and under "Economic Framework for Decision" (pages 71-81), together with the values attached to political representation and federalism manifested in our legal-political research. This mix of criteria also accommodates the characteristics of the existing institutional-legal frameworks not only by including a feasibility criterion but also by tailoring the other criteria to the range of desired possibilities.

1. Comprehensiveness of Planning and Decision-Making Respecting Resources. Agencies and their patterns of interaction should be suited to weighing objectively the competing and complementary uses of water and other natural resources (such as land required for reservoir sites). In short, the agency should have a multipurpose perspective.

This does not imply downgrading the priority of water supply for meeting household and business needs, which purposes are here assigned highest priority.² However, where water sources are relatively abundant, and technological alternatives are available, several means of obtaining and distributing water, entailing varying types and amounts of environmental opportunity costs and benefits, may be formulated.

Multipurpose consideration of water development is a criterion adopted by the Water Resources Council and by congressional policy statements on water project procedures.³ Water supply development can be adapted to flood control, irrigation, navigation, hydroelectric power, recreation, conservation, and environmental quality. With rapid urbanization and increase in population densities, the last three purposes, which more frequently conflict with water supply than the others, have assumed growing importance. This criterion calls for development and application of relatively objective methods of weighing water resource factors and clarifying presently uncertain issues in the process of planning, designing and authorizing projects. (Examples of current issues debated often with little objective analysis are effects of flow changes on estuary characteristics and other ecological factors; salt front responses to high flow skimming; public health aspects of waste water

2. Water law systems usually assign first priority to water for human consumption and domestic use. D. Haber and S. Bergen, The Law of Water Allocation (New York: Ronald Press Co., 1958).

3. United States Senate, Document 97, Policies, Standards and Procedures in the Formulation, Evaluation and Review of Plans for Use and Development of Water and Related Land Resources (1962).

recycling and recreation uses of reservoirs; and land use options and the influence on them of water resource development patterns).

2. Responsiveness to Various Interests and Groups in Society.

Planners and decision-makers concerned with water management should be accessible to competing claimants (conservation and recreation interests as well as water users) so that each may have a "day in court." This implies not only that the various parties have a chance to be heard but that their voices will be taken seriously, and that there will be machinery for considering competing claims and conflicts over water use and for communicating information and policy justifications to them. Without such processes, frustrated groups will increasingly find ways to block projects. In addition, the organizational structure must be suited to timely and equitable resolution of disagreements between source and service areas, and of disputes over allocation of favored sources among different regions and municipalities.

The state legislatures and state planning bodies have commonly handled these issues at the intrastate level. (In the past, limited interests have frequently dominated the process; for example, health authorities opposed to recreational use, and operating supply agencies seeking to maximize their distribution to municipal systems.) At the interstate level, even compact agencies have found allocation of water among states difficult, with disputes ending up in the Supreme Court or in lengthy ad hoc negotiations.

In the future, arrangements should provide for more continuous equitable, and rapid mechanisms of response. These issues are too intensively felt in this region to be resolved ultimately by administrative fiat. Political flak would undoubtedly be aimed at and around any insulated decision-making, however technically competent.

It may be, of course, that representative decision-making diverges from the multiple means, multiple purpose determination called for by criterion one. The former is likely, however, to be affected by the improvements in policy analysis.

3. Adequate Geographic Scope. The implications of this criterion vary with the type of program considered. In some instances adequate jurisdiction must be defined from the viewpoint of the users; thus adequate jurisdiction for New York City implies the ability to reach out to water supply sources far away from the city's boundaries-- as many and as far as need be to meet the city's requirements. In other cases, the need is for jurisdiction sufficiently large to make efficient use of a major source-- a large aquifer, reservoir, or river basin. There are several major project alternatives listed in the draft engineering reports for which none of the currently operating supply agencies has adequate jurisdiction.

4. Technical Capacity for Planning, Engineering, and Economic Analysis. This capacity is in part dependent on the size of the agency--

it must be large enough to command the necessary expertise. Extensive use of consultants has characterized the water supply field in the past, permitting small local agencies access to specialized talent. Water agencies, themselves, however, should have adequate capability to judge consultants' work and to undertake policy analyses. Because organization of a technical staff is time-consuming, the criterion, taken by itself, gives considerable weight to the larger existing agencies with strong staffs, even though all need strengthened capacity for comprehensive water management, including capacity for economic and political analysis as well as engineering, hydrological, and ecological analysis. Insofar as expertise of larger agencies is made available to others, the need for in-house capability is modified.

5. Adequate Financial Capacity. The definition of adequacy, of course, depends on the purposes for which financing is desired. Several state constitutions and statutes make special provision for water supply bonds (exempting them from debt ceilings and referendum requirements), and state and local governments have usually been ready to finance water supply projects when interests agree, the more so because water supply obligations can be made self-liquidating. When bond issues have been delayed by legislatures or turned down by voter referenda, opposition to projects for which financing is sought is usually the cause (such as conservationists' opposition to dam building). In other words, the heart of the problem is

obtaining agreement on projects, not finding a source of funds.⁴ Referenda do tend to slow decision results, because voter turnout is usually stronger among specific opponents than general beneficiaries. Most water supply bond issues in the NEWS regions are not subject to referenda, however. Projects with high operating costs require additional consideration of the capability of an agency to utilize pricing and other sources of operating expenditure.

Whether existing systems will provide finances for the programs listed by the NEWS engineering studies is an open question. The costs of the alternative programs to 1980 far exceed those funded in the last two decades, but agreement is lacking within the region as to which of these programs is desirable within this decade. The relative likelihood of adequate funding is, however, one measure of comparison among organizational options. These likelihoods are directly affected, of course, by whether water supply projects are entirely self-financing from the sale of water or whether development costs (or unusual operating costs) for exploiting selected sources are subsidized.

The main purposes of subsidies could be: (1) to induce state and local water authorities to move sooner than they would without subsidies; or (2) to pursue other ends implied by the criteria here listed--

4. Thus, conservationist blocking of bond issue passage cannot be considered primarily a financing problem; it is, rather, a problem of resolving competing interests in the resources, assuming an available bond market. In some cases such sources of defeat actually reflect legitimate environmental opportunity costs overlooked in project planning.

such as more efficient management (e.g., by attaching management standards like conservation or full metering to reimbursement abatement agreements), reduced environmental opportunity costs (e.g., by subsidizing project alternatives that generate less ecological damage or interfere less with recreation than others), or increased political feasibility of other objectives sought. These ends should be carefully weighed against the effect of subsidy to stimulate greater use of water than would otherwise occur and the needs for public funds for other purposes less suited to self-financing.

As noted above, water supply in many instances is only one aspect of water resource management. Any given project may have a number of associated purposes, such as pollution abatement, flood control, recreation, etc., which produce few salable products and whose value must be estimated more or less arbitrarily. The ability to finance water supply in such cases may depend in large part on the ability to obtain funds for such associated purposes.

6. Political and Legal Feasibility. The feasibility of empowering new organization and modifying old ones depends partly on the likelihood of legislative approval of form and powers. The criterion of political feasibility also stresses the ability of an organization to gain acceptance from, and work with, other parties concerned with water management in the region and parts thereof-- including state governors, legislatures, and planning bodies, municipalities, private firms, and highly vocal citizens' groups. Part of the problem, particularly in dealing with

the last group is the credibility gap stemming from inadequate plans or inadequate communication. Improvements in all these matters might well expedite acceptance and hasten the implementation process.⁵

7. Quality of Resource Management. Finally, motivation for achieving efficiency; for discovering and testing innovative techniques and hardware (particularly important in providing "insurance water"); and for development of analytic procedures for complex policy formulation for multipurpose projects is among the least measurable and most important ends to be sought from an organizational arrangement for water supply.

5. The several years' drought culminating in the "crisis" year 1965 is often cited as evidence of the incapacity or unwillingness of states and municipalities to foresee and finance their own needs, and some areas are still not protected against a recurrence of a drought of similar magnitude. The failure to go all out in insuring against the repetition of 1965 is by no means irrational, however, particularly in a highly urban region with high priorities in such competing values as water pollution control and conservation, and with the uncertainty of drought recurrence in the decades of concern to NEWS.

C h a p t e r 5

ILLUSTRATIVE REGIONAL OPTIONS

The Status Quo

As described previously, the status quo in water supply operations in northeastern United States is dominated by local governments and private utilities. Most of the systems are quite small, but the largest ones cover broad metropolitan areas. State planning is gradually growing stronger.

Current concern over the water supply service questions the capability of small local units to provide adequate supplies for the future, in the face of competing demands for new sources, without incurring increasingly serious external costs. First, the expertise available to some local areas limits the variety and scope of projects that they propose. Second, projects have been generally financed from bond issues and repaid through user charges. This kind of debt financing further limits the consideration a developer can give to uses of the water which may not pay for themselves, or to negative external effects that would be expensive to eliminate. Third, as local supplies have reached their capacity, municipalities have been forced to look beyond their borders for new sources. This requires voluntary cooperation between the source and service areas, and it is well documented that municipalities have had great difficulty achieving cooperation, particularly where conditions for a convenient trade-off are lacking. However, eventually during normal times, and more often in the midst of a crisis, municipalities do come to agreement, and some sort of contract is signed.

Most states have allowed or encouraged the emergence of regional organizations for some type of development planning, and the largest metropolitan areas have formed regional systems around a central city nucleus. These city-based regional systems have long histories, are efficient, maintain highly qualified professional staffs, and have been, in the past, successful at tapping new sources. At the same time, however, their interests have been focused only on their own service areas, and on single purpose water supply development. Recently, as remote potential source areas have gained in population, and as the concern for protection of environmental conditions has grown, even these large supply systems have been encountering obstacles to their plans. They also are beginning to have to depend more on decisions at higher levels for system expansion. But there is not yet a clear pattern for handling these problems.

The influence of state governments in the water supply field has been limited, exercised chiefly through regulatory functions such as approving rates, monitoring quality, and approving allocation of sources. Local and regional problems of obtaining new sources are intensified by increased pressures on the state from environmental interest groups.

Most states have not provided financial assistance for water supply development, and except in severe droughts, water supply issues have been dormant politically. The present interest in state (and federal) plans for water resources arose out of the drought of the mid-1960's. Since then, the general trend in states appears to have been toward more

activity as demonstrated by the reorganization of state administration in order to promote better statewide management and an increased attention to planning.

The feasibility of project management by interstate river basin agencies is uneven. Whereas negotiations on the creation of a Hudson commission have been stalemated for years, the Delaware River Basin Commission is scheduled to operate wholesaling of water produced by the proposed federal Tocks Island Reservoir. Interstate agencies have been given the power to review and approve plans of riparians, and will have significant influence over the long-term management of a river.

The federal contribution to the water supply field has been restricted. In the past, federal construction projects in this region have been designed for predominantly flood control and reclamation purposes and their water supply cost component was fully reimbursable by state and local authorities. The inflexibility of that process of providing federal assistance has severely restricted support for comprehensive programs that will be needed in the future.

The consideration of environmental effects of projects is a new concern in water resource development and management, and inputs into the process are varied. County-based review commissions financed largely by the state have had some influence in one state, while the same kind of entity, receiving no state support, in another state has had little impact. Environmentalists in all the states, now consolidating their forces, have

won wide support from the general public in their efforts to obstruct projects, and communication between the conservationists and the builders is still rudimentary.

Research on new technologies has been scattered throughout the government, and has not been applied to demonstration projects to any great extent.

In summary, the continuation of the organizational status quo is feasible. The probable outcome of this alternative is that regional projects will be based on ad hoc intergovernmental agreements that are slowly and stutteringly ground out of the process of political conflict. It may be that prolonged drought and widely evident threats of shortages will be needed in some places to stimulate concerted action. Coordination and direct action by state governments will undoubtedly continue to grow. Eventually, state water resource agencies may become major supply developers.

This alternative does not provide a ready basis for comprehensive water resource policy analysis or coordinated supply, treatment and disposal programs, because of the dominance of single purpose agencies. In the large metropolitan areas, existing agencies do for the most part have access to adequate financing for water supply development when they are able to obtain authorization. They have the advantage of being a strong part of local government and rate fairly high on technical capabilities. The metropolitan agencies, however, tend to be unrepresentative of source area interests and of suburban consumer interests. Their dependence upon state

approvals for new water supply development, however, does subject them to the influence of these interests and brakes their pace of operation.

Many of the smaller local water supply systems simply do not have the geographic scope, technical capability, or financial access to develop additional new sources.

Strengthened Systems of Local Initiative

There are several measures that might be taken to improve incrementally the performance and capacity for carrying out regional developments of water supply systems dominated by local governments and private utilities.

First, the state and local governments might form regional councils or, where they already exist, adapt regional councils to supervise city-based regional suppliers, and where necessary to absorb and consolidate small local water systems. The specific attributes of the regional agency (e.g., public authority governed by a board appointed by the regional council, or city corporation subject to certain review and approval powers of the regional council) must be worked out in each case, depending upon the redistribution of assets, powers and interests that must be negotiated. Where the assets of existing systems are owned by particular city governments, those governments might be given majority representation on the new policy councils which would oversee their operations. State legislation and state leadership would be crucial to instituting this model of regional institutional development. The regional councils could be given comprehensive planning responsibilities (or

existing planning councils be given this water supply responsibility). They could also be authorized to develop or acquire regional treatment and disposal facilities. The regional councils might be structured as public benefit corporations, or their counterparts, under state law in order to be equipped to acquire local supply, treatment and disposal systems when and where appropriate, and to develop new regional sources from which they sold water wholesale to existing distribution systems, as well as serving as policy councils for large urban systems not directly acquired. As such, they or their subsidiaries could obtain financing by revenue bonds for specific self-supporting operations, while depending upon government grants and appropriations for planning and nonrevenue producing activities. Basic regulatory powers would remain with the state government.

Operating agencies supervised or managed by the council could retain special local jurisdictions where feasible, either as special tax districts managed by the regional council, as operating public authorities supervised by it, or a combination of the two.

The regional councils might be composed of representatives of state, city and county governments and major operating agencies in the region, with nonvoting participation of major private utilities supplying water in the region. Weighted voting might be devised to assure that population was reflected in the decision-making structure. The statutory authorization for the council might also call for nonvoting participation by appropriate federal regional offices, and for public hearings upon

draft plan outlines as well as later in the decision-making process (e.g., on specific project proposals).)

Second, full development by state government of multiple purpose water resource plans might identify priorities for water resource use and for specific program alternatives that affect the state's water sources. All local and regional applications to the state government for approval of water allocation and supply quality could then be subject to explicit policy review in terms of policy regulations and trade-off priorities of the state plan.

The state would maintain a master plan for water resource and related land developments. Through its control over the allocation of water sources, its liaison function in federal grant applications, regulatory power over water quality standards, and technical and financial assistance, the state could exercise considerable influence over local action, yet allow localities to take the initiative in proposing programs. State legislation could, of course, prohibit construction in specified areas. The federal government might continuously evaluate local systems, make recommendations as to the adequacy of the systems for future needs, and formulate contingency plans to prepare for possible recurrence of serious drought.

Third, state and federal governments might develop programs of financial assistance for local and regional water supply projects designed to induce improved project design, selection and management. The state might offer grants to cover general benefits of a project otherwise financed

by bond issues of the operating agencies. Similarly, financial assistance might be made available by the federal government for projects meeting specified criteria. Localities wishing to qualify might be required to apply through their appropriate regional council to a federal agency, such as the COE, for technical assistance to help them develop programs that would both meet their own priorities and the criteria developed by the federal government for eligibility for federal funds.

Under such an approach, upon request of the operating authority, the COE might be authorized to prepare plans and program designs, at federal expense, which build in cost and benefit factors for recreation, ecological effects, treatment and disposal, as well as water supply. These programs, as modified in cooperation with the local agency, would then be subject to review by the regional council (which might serve as clearing-house for federal review under Office of Management and Budget Circular A-95) as well as review by the state water resources agency. The projects might then be eligible for specified federal grants.

In this way the COE, for example, could build into a project (or offer nonreimbursable assistance for) elements to minimize disturbances to the environment, to experiment with and demonstrate with new technologies, and to institute pollution abatement measures. This would relieve localities or regional systems from having to pay for parts of projects that could not easily be reimbursed out of user charges. The COE could also make available low cost loans for water supply development, and adjust

reimbursement schedules so that compliance of plans with federal priorities would be rewarded by higher levels of assistance.

The federal government might set up resource research institutes to study new technologies and the many unknowns that have recently made decisions on water supply projects very difficult. Such institutes would also serve as the data storage banks for water resource-related studies conducted by other agencies, and disseminate information to municipal and state governments. The COE could carry out specific projects based on the research of the institute that demonstrate the technical, environmental, social and economic feasibility of such projects.

The state water resource agency and/or Corps of Engineers might develop permanent planning, project design and evaluation staffs to be assigned to local and regional agencies on request. Such domestic technical assistance could greatly enhance the policy-making capabilities of existing agencies and improve intergovernmental relations at crucial operating levels within the bureaucracy.

These approaches, in concert, could go far in overcoming the weaknesses of current patterns of water supply planning and management. Giving source area and suburban consumption area residents some representation in policy mechanisms for city-based regional systems would improve the representativeness of the systems and, perhaps, expedite resolution of conflicts among these interests for new project development and agreement on rates. This approach builds upon the traditional responsibility of local government in this field while focusing growing state and federal

involvement on inducing specific types of improvement in performance. The approach is most suitable to mainly intrastate projects and would have to be supplemented by federal or intergovernmental approaches where major interstate projects are called for. Moreover, key components of this approach are the preparation and application to regulatory processes of meaningful state plans and federal priorities. In the five years examined for this study, both comprehensive planning at the state level, and review of grant applications under A-95 procedures have to date fallen far short of identifying operational criteria for project evaluation and applying them to review processes. The danger in this approach is that state and federal aid will be extended to the local agencies without anything but token improvements in policy analysis and water supply management.

This approach does allow for maximum flexibility as to geographic jurisdiction, permitting regional functions to expand where desirable and feasible under the aegis of the regional councils, allowing viable local systems to continue, and encouraging compatible operations by state and federal agencies for projects surpassing intrastate regional scope.

State Leadership

Another alternative organizational framework for regional water supply would capitalize on growing state concern for water resource management. Within a natural resource or environmental affairs department of state government a bureau of water policy and supply would develop and implement regional supply projects and wholesale water to existing distribution agencies. Its project proposals would be subject to review by a

comprehensive planning unit, which would be a departmental staff agency or an adjunct water resources board.¹

Approval of local source development applications would be located in this bureau, with technical review by the state health department. The bureau should also be empowered to require interconnection of systems and interlocal arrangements as conditions of permits to divert ground or surface water.

For construction and operation of regional water supply projects, the bureau would operate through its own regional field districts. Viable local systems could continue to operate. The federal role would consist primarily of planning, of financial and technical assistance for demonstration and multipurpose projects, and of participation in interstate projects.

The director of the state bureau of water supply would be appointed by the commissioner of the environmental affairs department in which the bureau is located. That commissioner would retain powers to approve policies and procedures of the bureau.

The water supply bureau would review problems and prepare plans for each of the districts into which it divides the jurisdiction of the state, utilizing, where appropriate, existing regional planning arrangements. These plans might include proposals to take over small systems that are not viable, to construct and operate transfers among local systems, to

1. Alternative state structures for these roles are analyzed in Volume II of this study.

construct new regional supply facilities, and to approve specified developments by existing systems. Local public hearings should be required prior to approval of these plans by the commissioner of the environmental affairs department. The bureau should be required to specify in advance of construction transmission arrangements and tentative contractual arrangements for distribution. Regional advisory committees in each district might include representatives of existing water supply and disposal agencies as well as of recreation and conservation interests.

The bureau could enter into contracts with any local jurisdiction in the state to supply water. Its projects might require approval of legislative authority in counties or municipalities where they are to be constructed and where they will provide service. If such approvals were not obtained in a specified period of time, specific authorization of the state legislature might be sufficient.

In addition, the governor of the state might appoint two permanent executive commissions. One to be composed of heads of public planning units, would recommend policies for coordinating water resource functions with related land use and public expenditure policies, including control of subdivision developments. Members of the other executive commission, to be nominated by the governor and confirmed by the legislature, would recommend policies for the protection of the environment. Through a staff of scientists and interested citizens, the commission would maintain a continuous review of plans and make recommendations in public statements to the legislature and to the environmental affairs department.

This approach has several advantages. First and foremost, it is compatible with both continuation of local control where it is proving satisfactory, and expansion of the federal role, where desirable. The water supply bureau can be the state's agent for contracts with federal agencies or for implementing the terms of specific federal-interstate compacts.

It has adequate jurisdiction to realize economies of scale for new developments and by linking local systems. The approach falls short of bringing all problems in major interstate river basins under the control of the bureau, but the existence of a strong state department with definitive plans would enormously facilitate intergovernmental relations, either for contracts with federal agencies, or for participation in basin commissions and compacts. State leadership to settle local disputes is a prerequisite to successful federal projects in any case.

Under this state leadership approach comprehensive policy analysis, again, depends upon a meaningful planning process and coherent control by the environmental affairs department. The state planning arrangements described for strengthening local systems would be important aspects of state implementation as well. Linking comprehensive planning priorities with regulatory decisions and project designs is the key to comprehensive water resource management. This linkage problem would be a crucial focus of attention for the environmental affairs department which would include bureaus concerned with treatment, disposal and conservation, as well as water supply. The mere existence of the "umbrella" department does not

provide these linkages. The department must develop priorities and plans that lend definitive directions to its effort to coordinate the activities of various bureaus.

The functions of the state legislature, local approvals and public hearings, regional advisory boards, as well as two executive commissions provide multiple channels for representative access of a broad range of interests. At the same time, utilization of deadlines may restrain protracted stalemate. (E.g., transferring decision to the state legislature if approval is not forthcoming from local authorities in a specified time; requiring gubernatorial approval of plans on a periodic basis.)

Generally this type of state line agency depends upon legislative appropriations and legislatively approved bond issues which entail the credit of state government. These procedures do generate certain hurdles to financing, of course. One alternative method is revenue-bonding, in which case user charges from a given project do not accrue to the state treasury but are retained by the bonding agency and pledged to amortize the capital debt.

The state agency might be adapted by statute to accommodate requirements of revenue bonding. For example, an adjunct board might be created, consisting of the major officers of the department and the bureau. This board would be authorized to issue water supply revenue bonds-- not backed by the state credit. The water supply agency would have to have statutory guarantees of long-range life and protection against transfers

of functions and funds. The agency would be empowered to enter into contracts, fix rates for its services, acquire, construct, improve and operate supply facilities.

Various levels of action at the federal level would be consistent with this approach of developing state leadership. First and foremost, consolidated and strengthened federal requirements for planning should be applied, together with increased aid for state water resources development. The federal requirements should include standards for evaluating the adequacy and efficacy of plans, as well as operational standards for pollution control facilities.

Second, the COE might construct projects for purposes of interstate water supply and basin cleanup, with continuation of current procedures for state review. Federal financial aid might be made available in two forms: grants and loans to constructing state agencies, and payment of construction costs on federal projects with allowable discounts to reimbursements from state and local distribution agencies. Both of these forms of aid might be tied to specific improvements in program design and management. For example, to remove resistance to joining a regional system the federal share could be the costs of an environmentally responsive plan over a minimum out-of-pocket cost plan, plus financing of facilities under the 1958 Water Supply Act; or alternatively might vary the provisions of the 1958 Act. Review and recommendation of the application of these concepts would be carried out by COE regional offices which would maintain permanent planning staffs. Their decisions would be subject to the normal approvals

by the Secretary of the Army, the Water Resources Council and the Office of Management and Budget.

Under the chairmanship of the state department head, an inter-governmental coordinating group would meet regularly in each state to update and conform plans and to negotiate initial agreements for federal construction, financial aid or technical services. Major regional water suppliers and the COE planning staff would be represented on this committee. Congress might require that Coordinated Action Programs (CAP's) be approved by this committee in each affected state prior to authorization of federal construction or financing. The CAP's would specify tentative contractual arrangements and indicate the complementary roles in source development (e.g., land acquisition, state review, public hearings, construction, etc.), of the various governmental participants.

Any cost-sharing of operating and maintenance expenditure to achieve environmental values would be the responsibility of the state.

While the Corps of Engineers would create a center for research and development of innovative water supply technology, initiative for any new emphasis on demand management would lie with the state.

Any necessary interstate negotiations with respect to allocations of stream flow would be initiated by the states including requests for adjudication by the Congress or the Supreme Court.

Federal Initiative

Under this approach, the United States Congress would authorize federal water supply construction projects through regular procedures of

public works design review and submission by the COE. Requirements for reimbursement from state and local agencies might be discounted sufficiently to induce state and local officials to approve intrastate, as well as interstate, projects to be managed by the federal agency.

The Corps of Engineers would establish a permanent water supply planning group for metropolitan regions. State appointed staff from state and municipal agencies would meet with it regularly to develop guidelines, review plans on hand and determine, for example, when broader meetings should be held to select projects to be moved into detailed planning by the COE for eventual consideration for federal authorization.

Included in COE budget requests for water supply planning would be adequate funds to be used for augmenting state and local planning staffs to insure capacity for full participation in planning.

COE staff would be responsible for the accomplishment of environmental evaluations and coordination with agencies and groups concerned with environmental values. As in NEWS it would act as lead agency in other planning aspects.

Operation of facilities by the federal agency would be undertaken only as a last resort, when user jurisdictions and the state could not agree on an alternative that was also satisfactory to the Secretary of the Army and the Congress. As under present procedures the COE would obtain concurrence for regional plans from state, municipal, and other federal agencies as well as any basin commissions and present these to Congress.

The Water Resources Council might review all major plans prior to their submission to Congress.

Written comment on specific projects by the state environmental affairs department would be required. Throughout the planning process, regular meetings of advisory committees would be held. These committees should be selected by state and local officials to represent source area residents, conservation groups, and local governments. They should be consulted at several stages of draft plans and project design.

When projects were developed, the COE would insure that permits were secured in its own name or in the name of municipal or regional agencies who would operate the facilities. When others applied for permits to state agencies, other federal agencies or to the COE itself, it would utilize the regional plans developed to appraise or assist in the appraisal of whether what was proposed was in the public interest. Either through a basin commission or directly, the Water Resources Council would periodically appraise the development of regional facilities with respect to the concepts of multiple objectives, multiple purposes and multiple means planning and report its findings to the Congress and the governors of the states involved.

The principles of the 1958 Water Supply Act would be extended to all facilities, in addition to reservoirs, including related waste treatment facilities. In addition, capital cost incurred in excess of that of a least-cost plan in order to insure environmental responsiveness would not be reimbursable. A share of facility operating and maintenance costs

attributable to meeting the needs of an environmental objective would be eligible for federal grants-in-aid. In addition grants toward the local share comparable to those available in other federal programs might be a part of any plan submitted to the Congress. Local jurisdictions involved would certify and the COE would confirm that no proposed addition to regional capacity would replace any viable existing capacity. Repayment agreements at time of authorization and appropriation would be of the same form now utilized by the COE.

The Corps of Engineers would establish a center for research and development in water supply management. Its mission would be to develop, and cooperatively with local municipal systems, to demonstrate innovative approaches to supply conservation and use management. Special attention would be given to the problems of increased recycling, reuse, and substitution as well as alternatives to system capacity to meet annual demand peaks and year to year variation in natural supply. Adoption of proven management techniques might be made a condition of federal cost-sharing and financing of additions to system capacity.

This alternative could take advantage of the competence of federal agencies to promote multipurpose and multimeans approaches to water resource projects and to make relatively timely decisions respecting interstate basins. It is the strongest alternative in terms of financial resources tapped; it is the weakest alternative in terms of representativeness.

Federal decision-making for regional projects utilizes different channels of political access than state or local decision-making, emphasizing local interests that have strong links to Congress. The federal agency or authorizing legislation might design specific procedures to mitigate this effect. Relying more heavily on the regional advisory committees -- hearing them early and often-- is one such approach. Continuing to require project review by the state natural resource or environmental affairs department is another. Finally, working within the framework of a joint water supply planning group should begin at the initial stages of planning, not after draft programs are spelled out. Selection of consultants, of scope for plans, of evaluative procedures, all are crucial choices that will have to be cooperative to facilitate agreement on end results.

The federal revenue base is a superior source of funding to that of state and local governments. Use of federal funding to substitute for state or local funding might increase fiscal strength of organization for water supply; but this is not the case if federal funding on balance substitutes for user charges or private bond subscriptions. Therefore, the design of federal cost-sharing should be careful, and conscious of impacts on wholesale and retail pricing.

Federal leadership can be particularly useful in raising the legal and political feasibility of regional projects, particularly when focused on breaking stalemates among the states, and between state and local agencies. To do so, the federal agency will sometimes have to overcome reluctance to cooperate on the part of state and local agencies, and

various nongovernmental groups. Creditable support from a wide range of interests must be cultivated by the federal agency if it is to expedite project development and implementation.

A federal construction agency is not likely to have as broad a reach of related functions as a multipurpose intergovernmental corporation or a state environmental affairs department. This attribute is adjustable, however, and the potential for pollution abatement and waste disposal services should be considered in conjunction with water supply projects for federal construction.

Federal construction is a particularly attractive option for projects that entail unusual technical uncertainty and innovation. National spinoffs from demonstration of new methods can be substantial. Moreover, state and local agencies are seldom in a position to undertake the risks of innovative techniques, such as high flow skimming, comprehensive management of a ground water system, experimental recycling, and so forth.

The technical capabilities of the COE are high and this alternative could reduce dependence upon outside consultants. Its strength and weaknesses with respect to developing multidisciplinary policy analysis and project evaluation are unknown, as are those of the other alternatives. No existing agency in the field has an operational system for economic, environmental and engineering analysis in a comprehensive planning framework.

Finally, federal initiative is the most likely alternative to get under way quickly. Insofar as appropriate agencies and committees

of Congress stand ready to continue activity stimulated by the NEWS legislation, they seem to reflect a higher sense of urgency of northeastern water supply problems than state or local officials.

Intergovernmental Water Resources Corporation

Selected regional water supply projects identified through NEWS planning and consultation, might be operated by special interstate authorities established for that purpose and incorporating participation of several levels of government.

A regional water authority might be created to develop new sources or to absorb and expand existing water supply systems. It would be a public corporation with an independent legal, fiscal and personnel system. It might be run by a board of directors whose members were appointed by various government authorities, including: EPA, COE and the Department of the Interior; the governors and relevant department heads of the affected states; the executives of major cities; electoral colleges of counties outside the major cities. In addition several directors might be appointed by the President or governor for special competence.

This corporation might be authorized to float revenue bonds directly or through subsidiaries, and to utilize state and federal grants and loans for capital construction. It would retain operating revenues. In addition, any annual operating deficits would be reimbursed by federal, state and local governments under an established allocation formula. For example, 25 percent of operating deficits might be met by federal appropriations, 60 percent by state appropriations and 15 percent by local

governments. This would give the authority leeway to develop nonrevenue producing activities (such as river cleanup) and in conjunction with water supply wholesaling that is backed by revenue bonds. It would also facilitate government control through reviews in connection with appropriations processes.

The authority might contract with the COE for project planning and construction management. (Conversely, initial project implementation might be carried out by the COE and the facilities turned over to such a corporation for continuing operation.)

Specific pollution abatement and basin zoning powers might be delegated to such an authority in the initial federal interstate compact setting it up. Wholesale waste disposal services might also be operated by it, facilitating long-range coordinated supply, disposal and basin management programs. It would be specifically authorized to create and operate recreational facilities in connection with water resource projects. The corporation would acquire, construct and operate wholesale water supply and waste management facilities. It would market these services to existing state, local, and private utility distributors.

Its advantages include legal, fiscal and personnel operations independent from general government, and the facility with which it could supplement annual appropriations with revenue bonds and retained user charges.

The statute or compact establishing such a corporation would specify structural details, its range of potential functions, and its relations with existing governments.

One of the crucial legal issues to be researched and negotiated is that of establishing statutory obligation for legislatures to appropriate their share of operating deficits. If this commitment is not assured at up to substantial minimums, a strong organizational bias against non-revenue producing activities (such as pollution abatement) is likely.

Disadvantages of the special authority alternative include difficulty of passage of interstate compact legislation and rigidity of the resulting structure. The latter problem might be minimized by avoiding great detail in the initial legislation so as to provide for some future flexibility of powers and financing.

Other potential disadvantages of a corporate management alternative include the likelihood of its being divorced from general land and water resource planning, and state and local expenditure priorities. These tendencies might be reduced by explicit design. For example, such a corporation could be supervised by the New England River Basins Commission, or other intergovernmental coordinating group, which would be responsible for reviewing its project proposals in light of related regional federal, state and local plans. Provision could be made for substantial overlap in boards of directors of the intergovernmental authority and the supervising basin commission or coordinating group.

Any major developmental project to be carried out by the Water Resources Corporation would require approval by specified state and federal water resource planning agencies, as well as the federal Water Resources Council.

The functional and fiscal flexibility of this alternative is considerable if the Water Resources Corporation can begin its life with a water supply development and wholesaling project that will provide a revenue-producing nucleus of its activity. It must also be eligible for recreation, treatment and pollution abatement grants.

This alternative sacrifices local representational values except insofar as the authority must make its projects and rates acceptable to the retailing agencies and insofar as its board reflects local interests. Freedom from legislative approval and popular referenda for bond issues would expedite decision-making and might thereby speed up development of new sources. Specific safeguards would have to be developed, however, to replace these political channels for representation of competing interests (conservation and recreation groups, for example). Hence, the state and federal multipurpose planning and project evaluation procedures described under "Strengthened Systems of Local Initiative" would be crucial concomitants of this alternative, as well.